

VKN

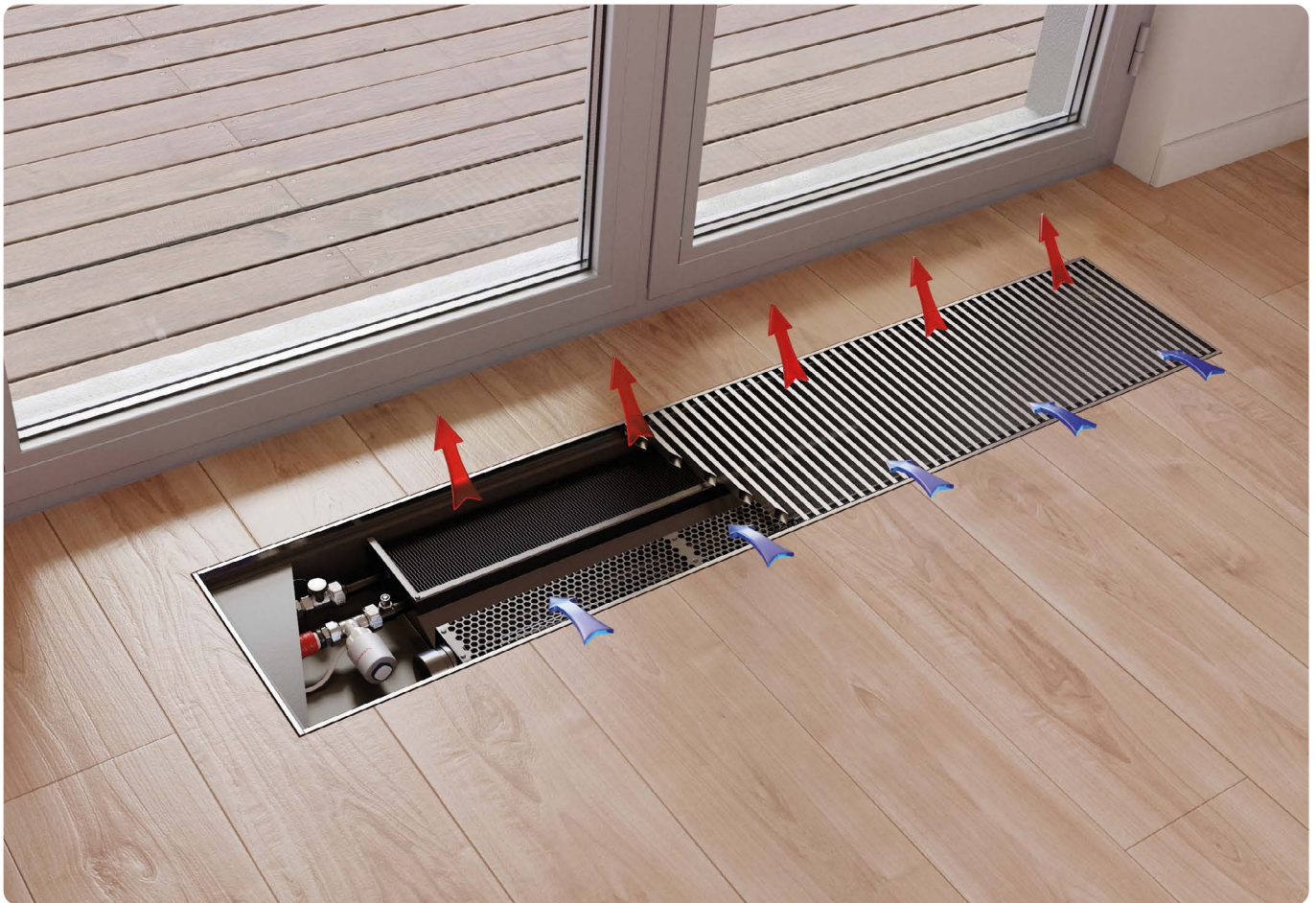
**FAN ASSISTED
TRENCH HEATERS**



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FORCED CONVECTION



OPERATING PRINCIPLE OF FAN ASSISTED TRENCH HEATERS

Convection heating systems utilize the phenomenon of heat absorption by air particles flowing through heat exchanger. The difference in densities of cold and heated air causes a delicate draft that initiates the airflow in the exchanger.

This principle is used in trench heaters, that is low mass, low water capacity and low heat inertia convection heaters.

These heaters are considered simplest in setting and allow for shortest reaction times for changes in room heat demand.

Use of fan allows to increase the airstream flowing through the trench heater exchanger, which in turn results in higher dynamics of heat transfer process and substantial increase of heating power of the trench heater.

The adjustment of fan heater is achieved by simultaneous change of fan speed and the light of the thermostatic valve with use of actuator fitted on that valve. The fan and the actuator are controlled by room controller that can be programmed according to user preferences.

The automatic adjustment of heater operation that initiates the heating mode only if it is required, allows for significant energy savings and thus lowering of operating cost of the whole building.

The fans used in VERANO products are equipped with low-voltage EC motors that allow for silent, safe and easy adjustment of heater.

You will find details pertaining to the construction of installation in the „Installation and maintenance manual for VKN fan assisted heaters“ section.



OUR ADVANTAGES



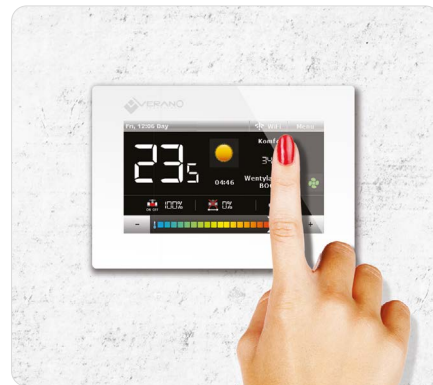
HIGHLY EFFICIENT HEAT EXCHANGER

Based on the research and development works, the optimal dimensions of the heat exchanger were used. As a result of that, an increase product heating output was obtained by 10 to 20%, depending of the unit length and height.



ADJUSTMENT OF THE TRENCH

Adjustment legs allow for easy, one-step adjustment of the height of the trench in the mounting hole, as well as its trouble-free levelling.



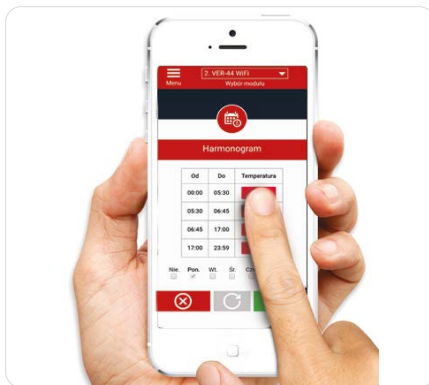
DEDICATED CONTROL SYSTEM

Modern room controllers allow for full control of heater operations.



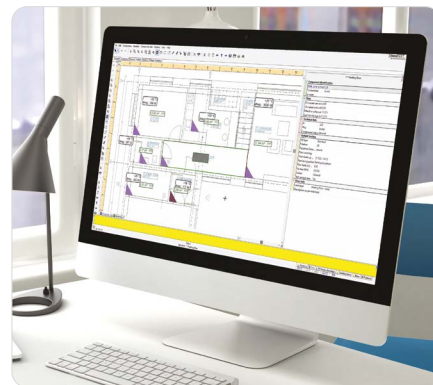
MODERN EC FANS

Using 24V DC fan motors will provide much quicker and quiet air distribution, yet the entire product is safe and hassle free for install and maintenance.



WIRELESS CONTROL

It is extremely easy to precisely control the heaters using a phone or tablet with the free application installed.



TOOLS FOR DESIGNERS

Our products are available in the renowned INSTALSOFT, SANKOM and AUTODESK REVIT design programs.



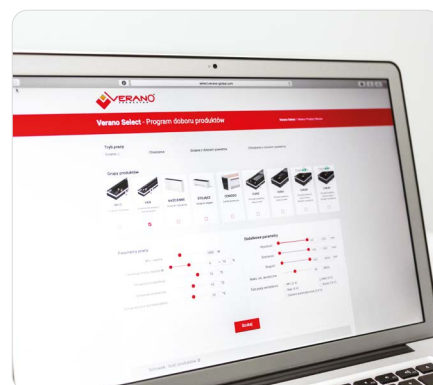
COMPLIANCE WITH EN 16430 STANDARD

VKN5 Verano trench heaters have been tested in accordance with the applicable EN 16430 standard, which confirms their high quality.



CAD AND BIM LIBRARIES

The VERANO product families used in BIM allow modification of the heater DIMENSIONS and the selection of the type of grille and frame. They also provide all information about the parameters of the products, and allow the heat output of the device to be measured depending on the operating parameters of the installation.



VERANO SELECT

The selection program enables the selection of an appropriate type of device for any operating parameters, depending on the required heat output.



CONFIRMED QUALITY

Years of thorough research, analyses and measurements, including those in the Warsaw, Cracow and Orlin Universities of Technology, Polish Academy of Sciences and own research we developed high class heating and heating-cooling devices.

They increase the energy efficiency of hot / cold air supply and significantly increase the efficiency of low-temperature systems that they work with.

The perfect technical parameters of VERANO products were also confirmed in the tests conducted in the HEATEST s.r.o. notified body and the Heizung – Lüftung – Klimatechnik Stuttgart at the Institut für Gebäude Energetik Universität Stuttgart.

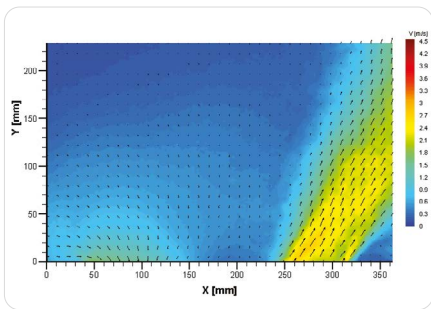
VERANO heaters are designed for heating both residential (detached homes and apartment buildings), office, service, retail, hotel, sacral spaces; sports objects, swimming pools and many others.

The choice of convector heaters is recommended to designers utilizing computer software for designing C.H. installation.

A correct technical design secures optimal choice of heater sizes and other devices, correct construction and hydraulic adjustment of heating installation, which influences future faultless and energy-saving use. VERANO heaters hold all the required EU documents:

- Technical approval and declaration of operating characteristics pursuant to the EN 16430 Standard,
- EU Declaration,
- PZH hygienic certificate.

RESEARCH AND DEVELOPMENT



The VKN series trench heaters are characterized by an air flow formed by specially designed airflow baffles. Thanks to the use of modern measurement methods (PIV - particle image velocimetry) as well as computer simulations (CFD - computational fluid dynamics), unfavourable phenomena occurring in operation of the trench heaters have been eliminated, e.g. the appearance of zones with very low airspeed and the return suction of already heated air.



This allows to reduce the airspeed in the zone where people are staying to generally acceptable levels. This in turn largely reduces the risk of discomfort connected with airflow, so called "draft". The heat output tests of VKN trench heaters are conducted in a climatic chamber located at the VERANO headquarters in accordance with the requirements of the European standard EN-16430.

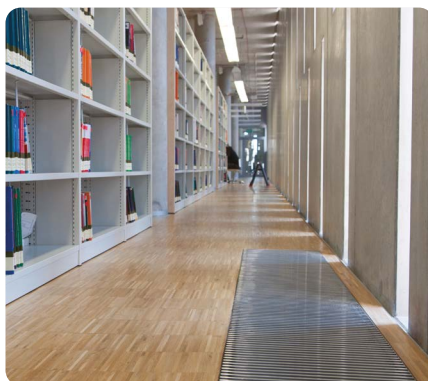


The acoustic power measurement of fan assisted VKN trench heaters is carried out in accordance with the European standard EN ISO 3744 at the VERANO headquarters. The measurement is made at points located on the measuring surface surrounding the tested heater above the sound reflecting plane. Thanks to the use of a digital sound analyzer, it is possible to measure broadband as well as in octave bands.

PROJECT EXAMPLES



• Piano House Apartments
Warsaw



• Scientific Information Center and Academic Library
Katowice



• Harley Davidson . Game Over Cycles
Rzeszów



VKN1 Height 65 mm and 90 mm

EXAMPLE OF PRODUCT VISUALIZATION



EQUIPMENT

STANDARD EQUIPMENT:

- casing made of galvanized steel sheet in RAL 9005 black,
- highly efficient cooper-aluminium heat exchanger, powder coated in black with air vent,
- modern fan with silent and efficient 24V DC motor
- connection space cover,
- fan cover, so called grille, with airflow baffle,
- water connection: 1/2" female thread,
- assembly struts,
- fixing anchors,
- levelling legs.

ADDITIONAL EQUIPMENT:

- casing made of galvanized steel sheet in RAL colour,
- decorative frame (F or L type) made of natural or anodized aluminium or painted in RAL colour,
- 18 mm high decorative grille:
 - roll-up: made of natural or anodized aluminium,
 - linear: made of natural, anodized aluminium or stainless steel or painted in RAL colour,
 - modular: made of natural or anodized aluminium,
- assembly fibreboard protection for installing and transporting,
- raised floor kit,
- bimetal temperature sensor,
- foil sleeve for heat exchanger or fan,
- air filter (requires trench casing height extension by 10 mm),
- BMS controllers.

DIMENSIONS

DIMENSIONS	[mm]
Trench height (H)	65, 90
Trench bottom width (B)	140, 170
Top width / Grille width (Bk)	164, 194
Trench length (L)	950÷2000

Non-standard (NS) heater lengths are available on request.

ORDER CODE:
VKN1-9/14/110 (L)

Trench height: H [cm] → 9

Trench width: B [cm] → 14

Trench length: L [cm] → 110

Connection side: L-Left / P-Right



HEIGHT 65 mm

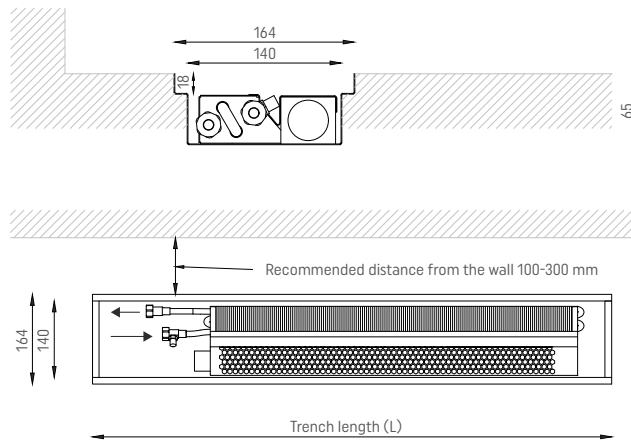
VKN1-6,5/14/L (L/P)

◀ ORDER CODE

DIMENSIONS	[mm]
Trench height (H)	65
Trench bottom width (B)	140
Top width / Grille width (Bk)	164
Trench length (L)	950÷2000

CONNECTIONS	TYPE
Connectors	½" female thread
Connection side	Left (L) standard, Right (P) optional

ACCESSORIES	TYPE
Grille H=18 mm	roll-up / linear / modular
Frame	L or F



TRENCH LENGTH	OPERATING MODE	HEAT OUTPUT FOR t_s/t_r			ELECTRIC POWER DEMAND	CURRENT	NUMBER OF FAN MOTORS
		75/65 °C	55/45 °C	35/30 °C			
L [mm]	[-]	Φ [W]			P [W]	I [A]	[-]
950	Min	99	59	25	0,8	0,03	1
	Med	447	268	112	1,2	0,05	
	Max	767	460	191	2,2	0,09	
1100	Min	116	70	29	0,8	0,03	1
	Med	525	315	131	1,2	0,05	
	Max	900	540	225	2,4	0,10	
1250	Min	149	89	37	0,8	0,03	1
	Med	673	404	168	1,2	0,05	
	Max	1155	693	288	2,7	0,11	
1450	Min	173	104	43	0,8	0,03	1
	Med	779	467	194	1,5	0,06	
	Max	1337	802	334	2,9	0,12	
1650	Min	198	119	49	1,5	0,06	2
	Med	894	536	223	2,4	0,10	
	Max	1532	918	382	4,4	0,18	
1800	Min	232	139	58	1,5	0,06	2
	Med	1050	630	262	2,4	0,10	
	Max	1801	1080	449	4,6	0,19	
2000	Min	248	148	62	1,5	0,06	2
	Med	1120	672	280	2,4	0,10	
	Max	1920	1151	479	4,8	0,20	

- Normative heating power output [W] compliant to EN-16430 for room temperature of $\Theta_a = 20^\circ\text{C}$.
- Control voltages for the respective modes of operation: Min - 2 V, Med - 4 V, Max - 6 V.
- Min, Med, Max fan speeds are for continuous operations.



HEIGHT 65 mm

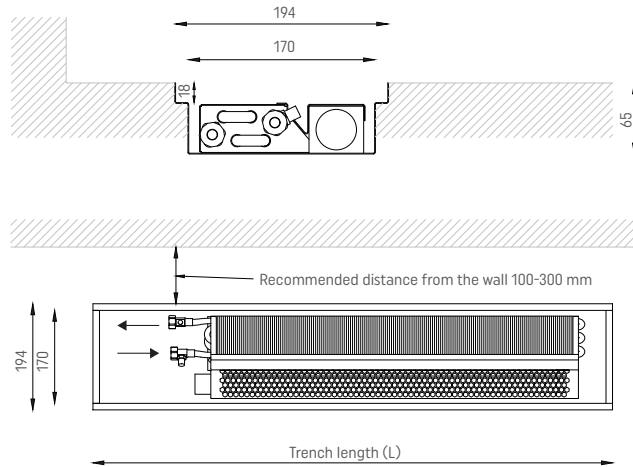
VKN1-6,5/17/L (L/P)

◀ ORDER CODE

DIMENSIONS	[mm]
Trench height (H)	65
Trench bottom width (B)	170
Top width / Grille width (Bk)	194
Trench length (L)	950÷2000

CONNECTIONS	TYPE
Connectors	½" female thread
Connection side	Left (L) standard, Right (P) optional

ACCESSORIES	TYPE
Grille H=18 mm	roll-up / linear / modular
Frame	L or F



TRENCH LENGTH	OPERATING MODE	HEAT OUTPUT FOR t_s/t_r			ELECTRIC POWER DEMAND	CURRENT	NUMBER OF FAN MOTORS
		75/65 °C	55/45 °C	35/30 °C			
L [mm]	[-]	Φ [W]			P [W]	I [A]	[-]
950	Min	107	64	27	0,8	0,03	1
	Med	559	335	139	1,2	0,05	
	Max	967	580	241	2,2	0,09	
1100	Min	126	76	31	0,8	0,03	1
	Med	656	393	164	1,2	0,05	
	Max	1135	680	283	2,4	0,10	
1250	Min	161	96	40	0,8	0,03	1
	Med	842	505	210	1,2	0,05	
	Max	1457	873	363	2,7	0,11	
1450	Min	187	112	47	0,8	0,03	1
	Med	975	585	243	1,5	0,06	
	Max	1686	1011	421	2,9	0,12	
1650	Min	214	128	53	1,5	0,06	2
	Med	1116	669	278	2,4	0,10	
	Max	1931	1158	482	4,4	0,18	
1800	Min	251	150	63	1,5	0,06	2
	Med	1313	787	328	2,4	0,10	
	Max	2271	1362	567	4,6	0,19	
2000	Min	268	161	67	1,5	0,06	2
	Med	1399	839	349	2,4	0,10	
	Max	2421	1451	604	4,8	0,20	

- Normative heating power output [W] compliant to EN-16430 for room temperature of $\theta_a = 20^\circ\text{C}$.
- Control voltages for the respective modes of operation: Min - 2 V, Med - 4 V, Max - 6 V.
- Min, Med, Max fan speeds are for continuous operations.



CORRECTIVE FACTORS FOR 65 MM HIGH VKN1 HEATERS

Heat output corrective factors for 65 mm high VKN1 units for installation temperatures other than 75/65/20°C.

SUPPLY AND RETURN TEMPERATURES [°C]		ROOM AIR TEMPERATURE θ_a [°C]						
t_s	t_r	5	8	12	16	20	24	32
90	85	1,651	1,591	1,511	1,431	1,351	1,270	1,110
	80	1,601	1,541	1,461	1,381	1,301	1,220	1,060
	75	1,551	1,491	1,411	1,331	1,250	1,170	1,010
	70	1,501	1,441	1,361	1,280	1,200	1,120	0,960
85	80	1,551	1,491	1,411	1,331	1,250	1,170	1,010
	75	1,501	1,441	1,361	1,280	1,200	1,120	0,960
	70	1,451	1,391	1,311	1,230	1,150	1,070	0,910
	65	1,401	1,341	1,260	1,180	1,100	1,020	0,860
80	75	1,451	1,391	1,311	1,230	1,150	1,070	0,910
	70	1,401	1,341	1,260	1,180	1,100	1,020	0,860
	65	1,351	1,290	1,210	1,130	1,050	0,970	0,810
	60	1,301	1,240	1,160	1,080	1,000	0,920	0,760
75	70	1,351	1,290	1,210	1,130	1,050	0,970	0,810
	65	1,301	1,240	1,160	1,080	1,000	0,920	0,760
	60	1,250	1,190	1,110	1,030	0,950	0,870	0,710
	55	1,200	1,140	1,060	0,980	0,900	0,820	0,660
70	65	1,250	1,190	1,110	1,030	0,950	0,870	0,710
	60	1,200	1,140	1,060	0,980	0,900	0,820	0,660
	55	1,150	1,090	1,010	0,930	0,850	0,770	0,610
	50	1,100	1,040	0,960	0,880	0,800	0,720	0,560
65	60	1,150	1,090	1,010	0,930	0,850	0,770	0,610
	55	1,100	1,040	0,960	0,880	0,800	0,720	0,560
	50	1,050	0,990	0,910	0,830	0,750	0,670	0,509
	45	1,000	0,940	0,860	0,780	0,700	0,620	0,459
60	55	1,050	0,990	0,910	0,830	0,750	0,670	0,509
	50	1,000	0,940	0,860	0,780	0,700	0,620	0,459
	45	0,950	0,890	0,810	0,730	0,650	0,570	0,409
	40	0,900	0,840	0,760	0,680	0,600	0,519	0,359
55	50	0,950	0,890	0,810	0,730	0,650	0,570	0,409
	45	0,900	0,840	0,760	0,680	0,600	0,519	0,359
	40	0,850	0,790	0,710	0,630	0,550	0,469	0,309
	35	0,800	0,740	0,660	0,580	0,499	0,419	0,259
50	45	0,850	0,790	0,710	0,630	0,550	0,469	0,309
	40	0,800	0,740	0,660	0,580	0,499	0,419	0,259
	35	0,750	0,690	0,610	0,529	0,449	0,369	0,210
45	40	0,750	0,690	0,610	0,529	0,449	0,369	0,210
	35	0,700	0,640	0,560	0,479	0,399	0,319	0,160
40	35	0,650	0,590	0,509	0,429	0,349	0,269	0,110
	30	0,600	0,540	0,459	0,379	0,299	0,220	0,060
35	30	0,550	0,489	0,409	0,329	0,249	0,170	0,010

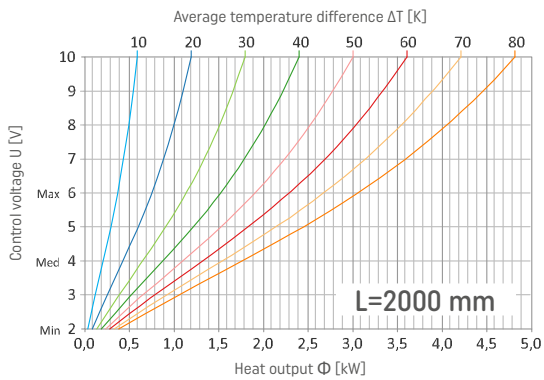
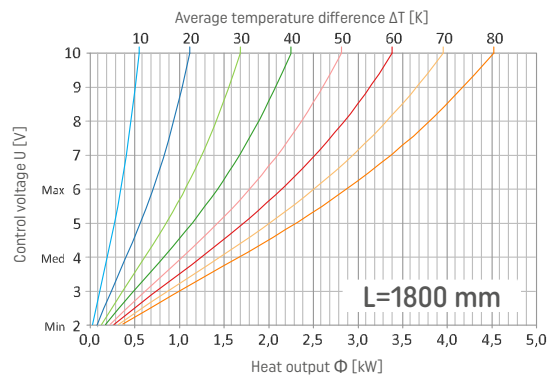
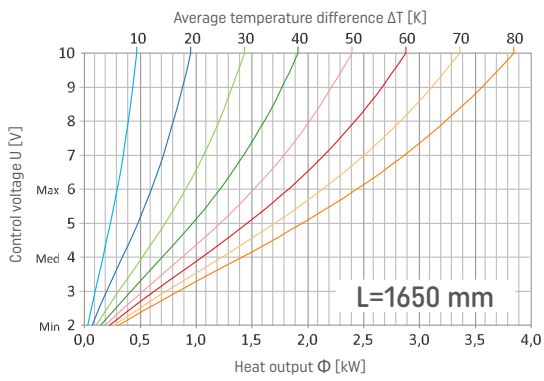
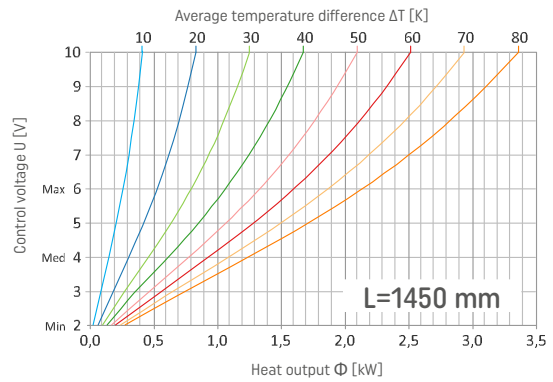
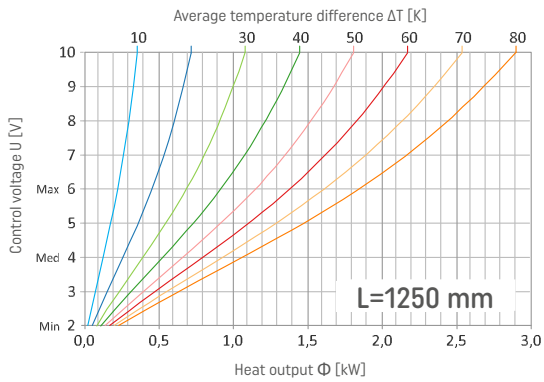
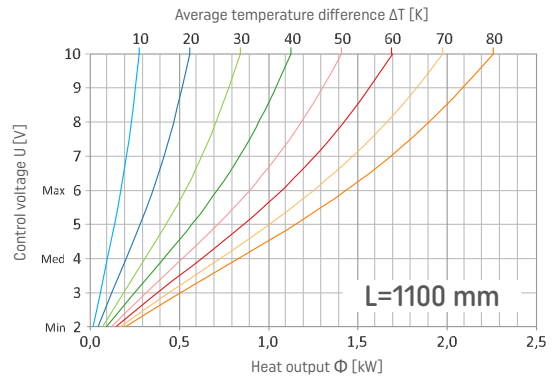
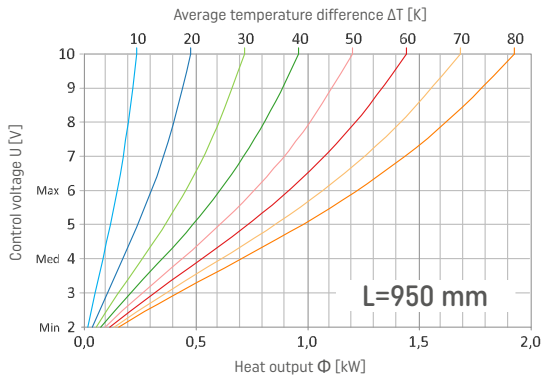
HEAT OUTPUT CORRECTIVE FACTORS FOR VKN HEATERS ACCORDING TO THE GRILLE TYPE

GRILLE TYPE	AIRFLOW	CORRECTIVE FACTOR
Roll-up double T-bar profile aluminium grille - 13 mm gap	67%	1,00
Roll-up double T-bar profile aluminium grille - 8 mm gap	63%	0,99
Roll-up closed profile aluminium grille	62%	1,00
Roll-up wooden grille	52%	0,98
Modular snap on profile aluminium grille	62%	0,97
Linear snap on profile aluminium grille	62%	1,08
Linear stainless steel grille	71%	1,09



HEAT OUTPUT OF VKN1-6,5/14/L

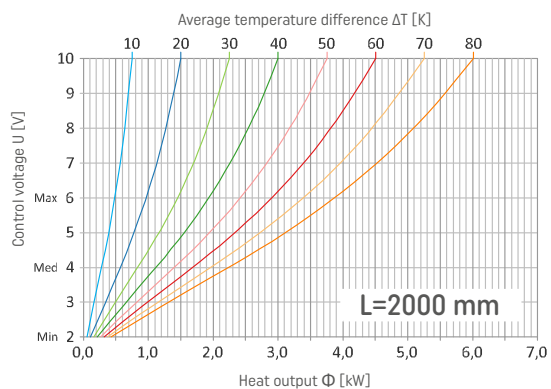
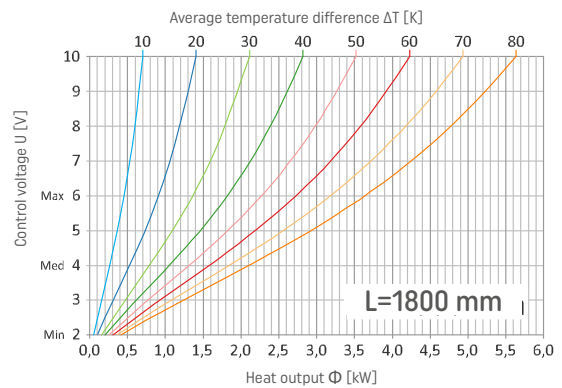
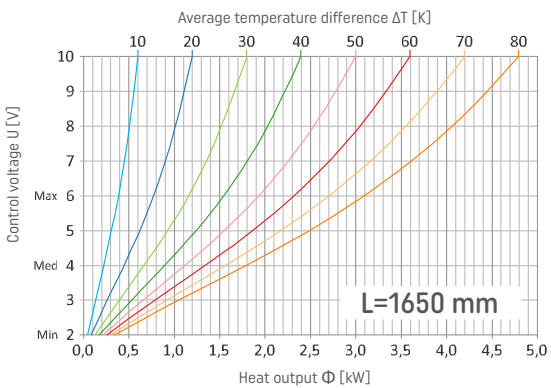
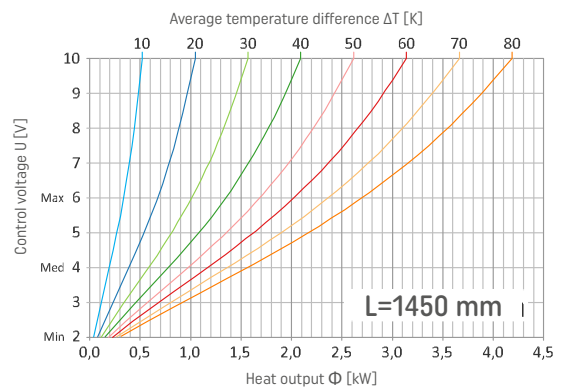
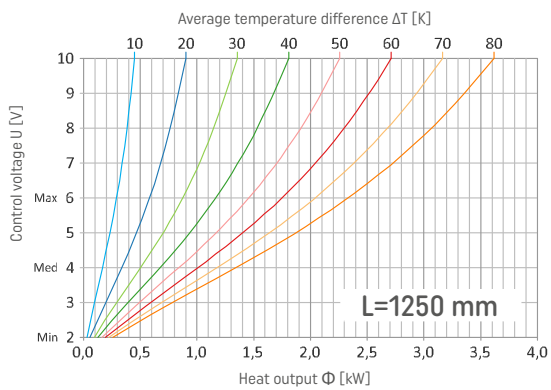
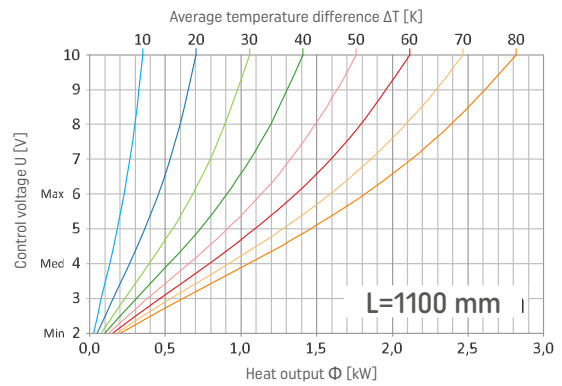
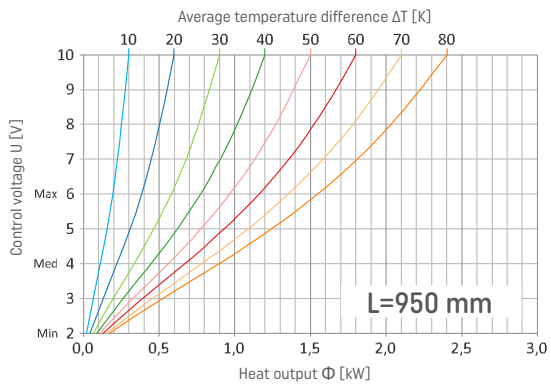
The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].





HEAT OUTPUT OF VKN1-6,5/17/L

The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].







HEIGHT 90 mm

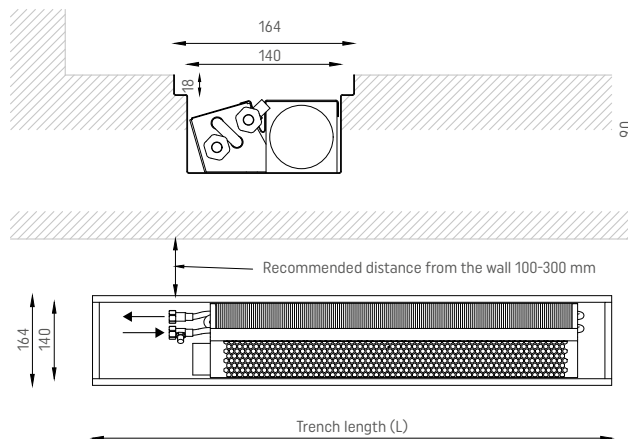
VKN1-9/14/L (L/P)

ORDER CODE

DIMENSIONS	[mm]
Trench height (H)	90
Trench bottom width (B)	140
Top width / Grille width (Bk)	164
Trench length (L)	950÷2000

CONNECTIONS	TYPE
Connectors	½" female thread
Connection side	Left (L) standard, Right (P) optional

ACCESSORIES	TYPE
Grille H=18 mm	roll-up / linear / modular
Frame	L or F



TRENCH LENGTH	OPERATING MODE	HEAT OUTPUT FOR t_s/t_r			ELECTRIC POWER DEMAND	CURRENT	NUMBER OF FAN MOTORS
		75/65 °C	55/45 °C	35/30 °C			
L [mm]	[-]	Φ [W]			P [W]	I [A]	[-]
950	Min	230	138	58	1,0	0,04	1
	Med	559	337	141	2,2	0,09	
	Max	846	509	213	5,3	0,22	
1100	Min	270	163	68	1,0	0,04	1
	Med	656	395	166	2,4	0,10	
	Max	937	564	236	6,0	0,25	
1250	Min	346	208	87	1,0	0,04	1
	Med	842	507	212	2,7	0,11	
	Max	1275	768	322	7,2	0,30	
1450	Min	401	241	101	1,2	0,05	1
	Med	975	587	246	2,9	0,12	
	Max	1476	889	372	8,2	0,34	
1650	Min	484	291	122	2,0	0,08	2
	Med	1178	709	297	4,4	0,18	
	Max	1784	1074	450	10,6	0,44	
1800	Min	565	340	143	2,0	0,08	2
	Med	1374	827	347	4,6	0,19	
	Max	2081	1253	525	11,3	0,47	
2000	Min	600	361	151	2,0	0,08	2
	Med	1461	880	369	4,8	0,20	
	Max	2213	1332	558	12,5	0,52	

- Normative heating power output [W] compliant to EN-16430 for room temperature of $\Theta_a = 20^\circ\text{C}$.
- Control voltages for the respective modes of operation: Min - 2 V, Med - 4 V, Max - 6 V
- Min, Med, Max fan speeds are for continuous operations.



HEIGHT 90 mm

VKN1-9/17/L (L/P)

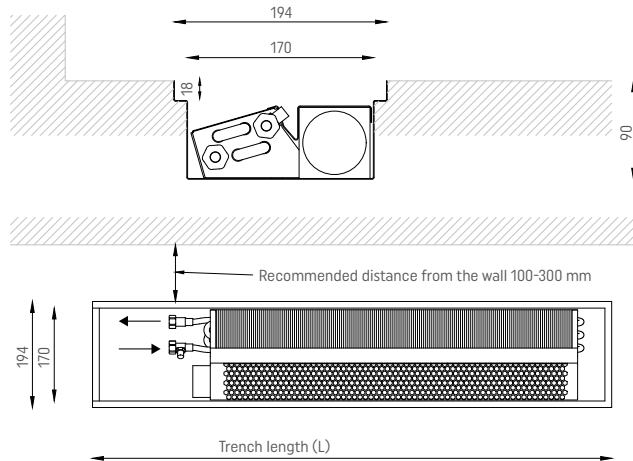


ORDER CODE

DIMENSIONS	[mm]
Trench height (H)	90
Trench bottom width (B)	170
Top width / Grille width (Bk)	194
Trench length (L)	950÷2000

CONNECTIONS	TYPE
Connectors	½" female thread
Connection side	Left (L) standard, Right (P) optional

ACCESSORIES	TYPE
Grille H=18 mm	roll-up / linear / modular
Frame	L or F



TRENCH LENGTH	OPERATING MODE	HEAT OUTPUT FOR t_s/t_r			ELECTRIC POWER DEMAND	CURRENT	NUMBER OF FAN MOTORS
		75/65 °C	55/45 °C	35/30 °C			
L [mm]	[-]	Φ [W]			P [W]	I [A]	[-]
950	Min	411	247	103	1,0	0,04	1
	Med	981	590	247	2,2	0,09	
	Max	1468	882	369	5,3	0,22	
1100	Min	482	290	121	1,0	0,04	1
	Med	1152	693	289	2,4	0,10	
	Max	1724	1036	433	6,0	0,25	
1250	Min	619	372	156	1,0	0,04	1
	Med	1478	888	371	2,7	0,11	
	Max	2212	1330	556	7,2	0,30	
1450	Min	717	431	180	1,2	0,05	1
	Med	1711	1029	430	2,9	0,12	
	Max	2561	1540	644	8,2	0,34	
1650	Min	821	494	206	2,0	0,08	2
	Med	1959	1178	492	4,4	0,18	
	Max	2932	1763	737	10,6	0,44	
1800	Min	965	580	242	2,0	0,08	2
	Med	2304	1385	579	4,6	0,19	
	Max	3448	2073	866	11,3	0,47	
2000	Min	1029	619	259	2,0	0,08	2
	Med	2456	1476	617	4,8	0,20	
	Max	3676	2210	924	12,5	0,52	

- Normative heating power output [W] compliant to EN-16430 for room temperature of $\Theta_a = 20^\circ\text{C}$.
- Control voltages for the respective modes of operation: Min - 2 V, Med - 4 V, Max - 6 V
- Min, Med, Max fan speeds are for continuous operations.



CORRECTIVE FACTORS FOR 90 MM HIGH VKN1 HEATERS

Heat output corrective factors for 90 mm high VKN1 units for installation temperatures other than 75/65/20°C.

SUPPLY AND RETURN TEMPERATURES [°C]		ROOM AIR TEMPERATURE θ_a [°C]						
t_s	t_r	5	8	12	16	20	24	32
90	85	1,647	1,587	1,508	1,428	1,349	1,269	1,110
	80	1,597	1,538	1,458	1,378	1,299	1,219	1,060
	75	1,547	1,488	1,408	1,329	1,249	1,169	1,010
	70	1,498	1,438	1,358	1,279	1,199	1,120	0,960
85	80	1,547	1,488	1,408	1,329	1,249	1,169	1,010
	75	1,498	1,438	1,358	1,279	1,199	1,120	0,960
	70	1,448	1,388	1,309	1,229	1,149	1,070	0,910
	65	1,398	1,339	1,259	1,179	1,100	1,020	0,860
80	75	1,448	1,388	1,309	1,229	1,149	1,070	0,910
	70	1,398	1,339	1,259	1,179	1,100	1,020	0,860
	65	1,349	1,289	1,209	1,129	1,050	0,970	0,811
	60	1,299	1,239	1,159	1,080	1,000	0,920	0,761
75	70	1,349	1,289	1,209	1,129	1,050	0,970	0,811
	65	1,299	1,239	1,159	1,080	1,000	0,920	0,761
	60	1,249	1,189	1,110	1,030	0,950	0,870	0,711
	55	1,199	1,139	1,060	0,980	0,900	0,821	0,661
70	65	1,249	1,189	1,110	1,030	0,950	0,870	0,711
	60	1,199	1,139	1,060	0,980	0,900	0,821	0,661
	55	1,149	1,090	1,010	0,930	0,851	0,771	0,611
	50	1,100	1,040	0,960	0,880	0,801	0,721	0,561
65	60	1,149	1,090	1,010	0,930	0,851	0,771	0,611
	55	1,100	1,040	0,960	0,880	0,801	0,721	0,561
	50	1,050	0,990	0,910	0,831	0,751	0,671	0,511
	45	1,000	0,940	0,860	0,781	0,701	0,621	0,461
60	55	1,050	0,990	0,910	0,831	0,751	0,671	0,511
	50	1,000	0,940	0,860	0,781	0,701	0,621	0,461
	45	0,950	0,890	0,811	0,731	0,651	0,571	0,411
	40	0,900	0,841	0,761	0,681	0,601	0,521	0,361
55	50	0,950	0,890	0,811	0,731	0,651	0,571	0,411
	45	0,900	0,841	0,761	0,681	0,601	0,521	0,361
	40	0,851	0,791	0,711	0,631	0,551	0,471	0,311
	35	0,801	0,741	0,661	0,581	0,501	0,421	0,261
50	45	0,851	0,791	0,711	0,631	0,551	0,471	0,311
	40	0,801	0,741	0,661	0,581	0,501	0,421	0,261
	35	0,751	0,691	0,611	0,531	0,451	0,371	0,211
45	40	0,751	0,691	0,611	0,531	0,451	0,371	0,211
	35	0,701	0,641	0,561	0,481	0,401	0,321	0,161
40	35	0,651	0,591	0,511	0,431	0,351	0,271	0,111
	30	0,601	0,541	0,461	0,381	0,301	0,221	0,061
35	30	0,551	0,491	0,411	0,331	0,251	0,171	0,010

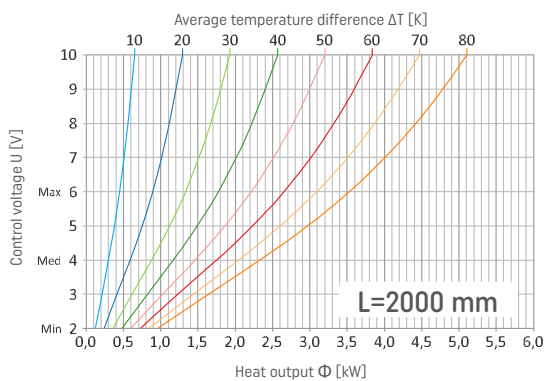
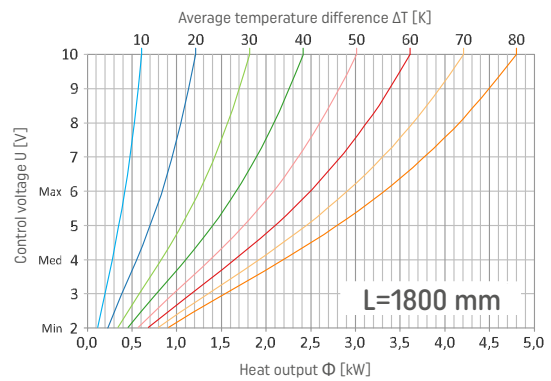
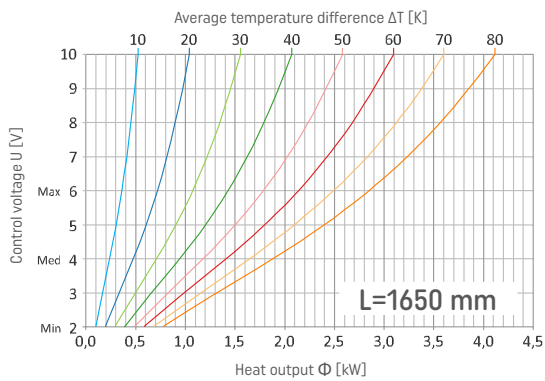
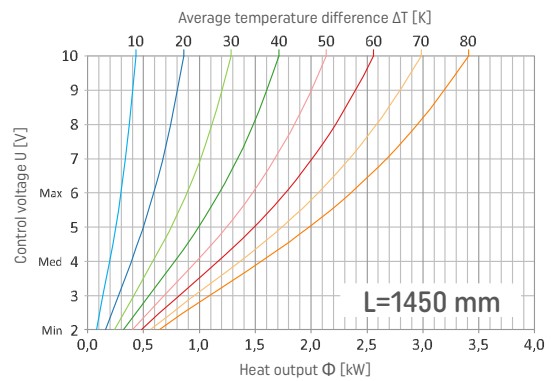
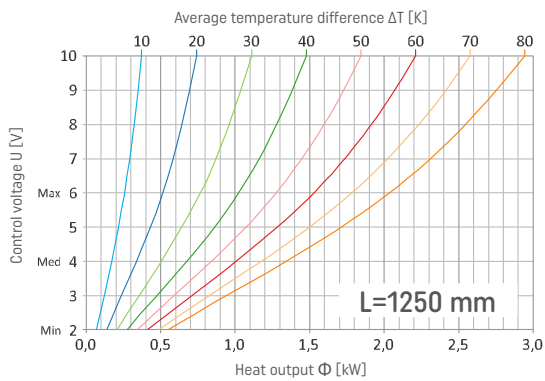
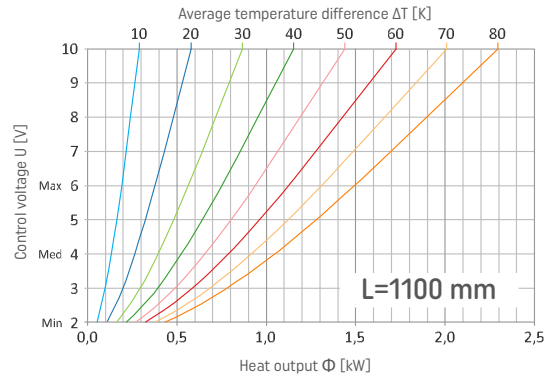
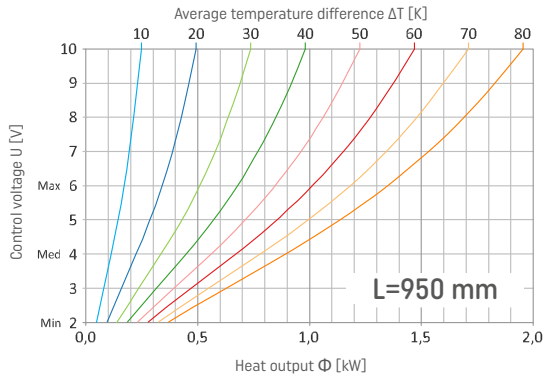
HEAT OUTPUT CORRECTIVE FACTORS FOR VKN HEATERS ACCORDING TO THE GRILLE TYPE

GRILLE TYPE	AIRFLOW	CORRECTIVE FACTOR
Roll-up double T-bar profile aluminium grille - 13 mm gap	67%	1,00
Roll-up double T-bar profile aluminium grille - 8 mm gap	63%	0,99
Roll-up closed profile aluminium grille	62%	1,00
Roll-up wooden grille	52%	0,98
Modular snap on profile aluminium grille	62%	0,97
Linear snap on profile aluminium grille	62%	1,08
Linear stainless steel grille	71%	1,09



HEAT OUTPUT OF VKN1-9/14/L

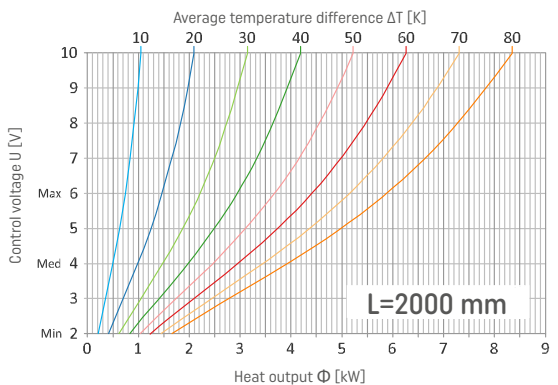
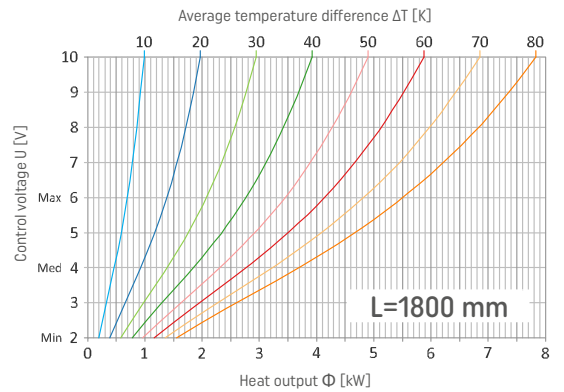
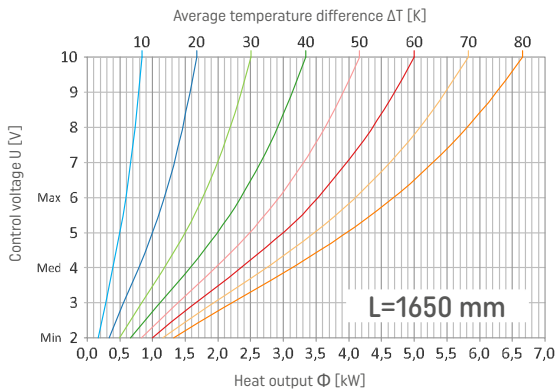
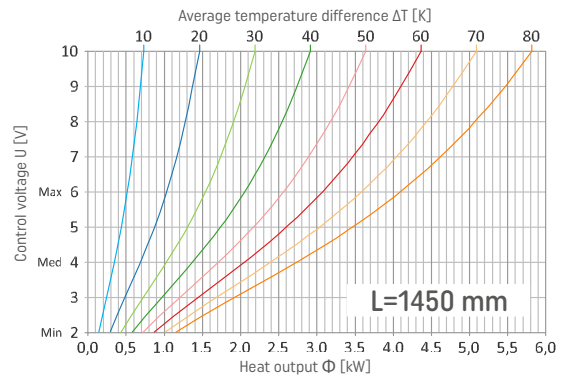
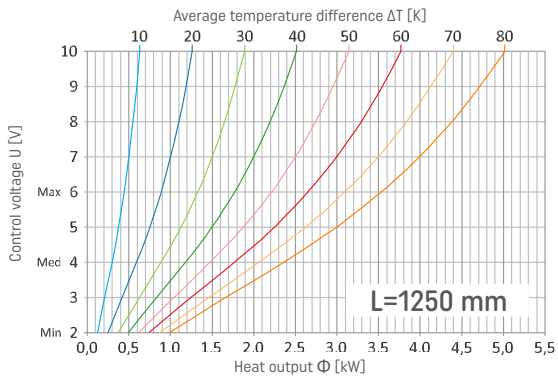
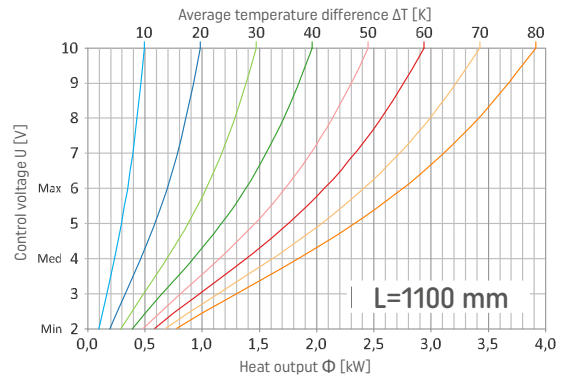
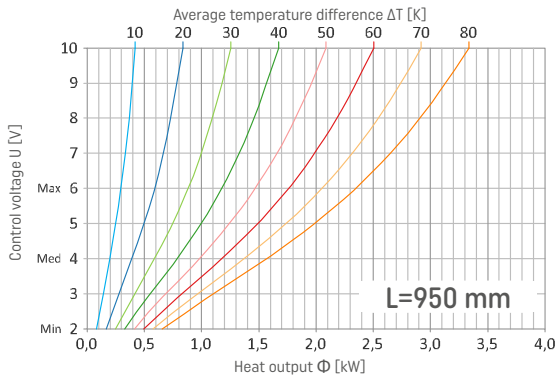
The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].





HEAT OUTPUT OF VKN1-9/17/L

The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].





VKN1 WATER CAPACITY

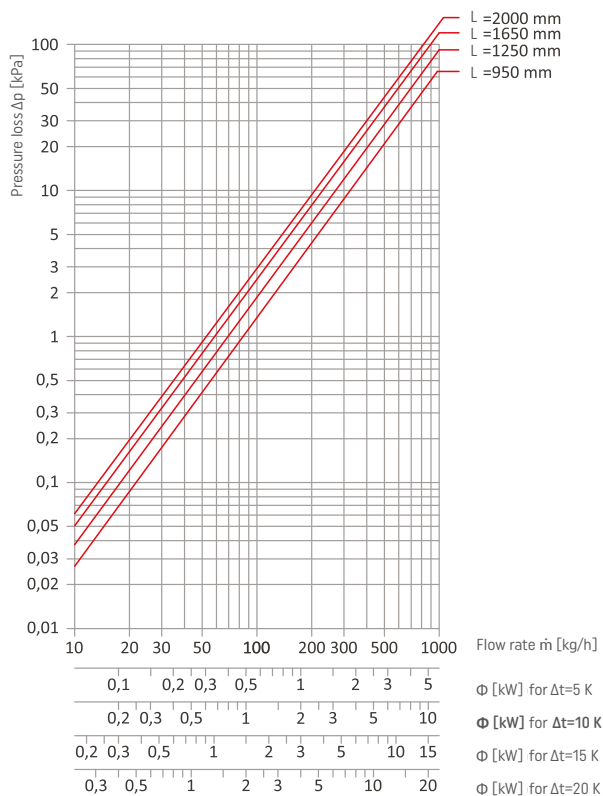
TRENCH LENGTH L [mm]	HEATER TYPE	
	VKN1-6,5/14/L VKN1-9/14/L	VKN1-6,5/17/L VKN1-9/17/L
	WATER CAPACITY [dm ³]	
950	0,20	0,29
1100	0,22	0,34
1250	0,28	0,42
1450	0,32	0,48
1650	0,38	0,57
1800	0,41	0,61
2000	0,46	0,69

DECLARED PROPERTIES

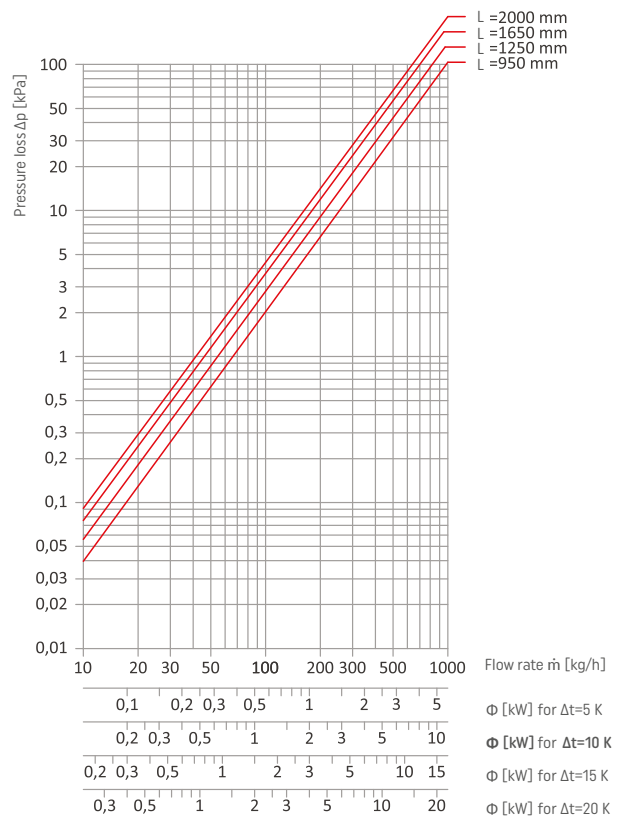
Maximum permissible operating pressure:	1,0 MPa.
Test pressure:	1,3 MPa.
Maximum hydraulic pressure:	1,69 MPa.
Maximum operating temperature:	110°C

PRESSURE LOSS

VKN1-6,5/14/L, VKN1-9/14/L



VKN1-6,5/17/L, VKN1-9/17/L





VKN5 HEIGHT 75 mm, 90 mm, 140 mm and 180 mm

EXAMPLE OF PRODUCT VISUALIZATION



EQUIPMENT

STANDARD EQUIPMENT:

- casing made of galvanized steel sheet in RAL 9005 black,
- highly efficient cooper-aluminium heat exchanger, powder coated in black with air vent,
- modern fan with silent and efficient 24V DC motor
- connection space cover,
- fan cover, so called grille, with airflow baffle,
- water connection: 3/4" female thread,
- assembly struts,
- fixing anchors,
- levelling legs.

ADDITIONAL EQUIPMENT:

- casing made of galvanized steel sheet in RAL colour,
- decorative frame (F or L type) made of natural or anodized aluminium or painted in RAL colour,
- 18 mm high decorative grille:
 - roll-up: made of natural or anodized aluminium,
 - linear: made of natural, anodized aluminium or stainless steel or painted in RAL colour,
 - modular: made of natural or anodized aluminium,
- assembly fibreboard protection for installing and transporting,
- raised floor kit,
- bimetal temperature sensor,
- foil sleeve for heat exchanger or fan,
- air filter (requires trench casing height extension by 10 mm),
- BMS controllers.

DIMENSIONS

DIMENSIONS	[mm]	
Trench height (H)	75, 90	140, 180
Trench bottom width (B)	250, 350	300
Top width / Grille width (Bk)	274, 374	324
Trench length (L)	950÷2750	800÷2700

Non-standard (NS) heater lengths are available on request.

ORDER CODE:

VKN5-9/14/110 (L)

Trench height:
H [cm]

Trench width:
B [cm]

Trench length: L [cm]

Connection side: L-Left / P-Right



HEIGHT 75 mm

VKN5-7,5/25/L (L/P)

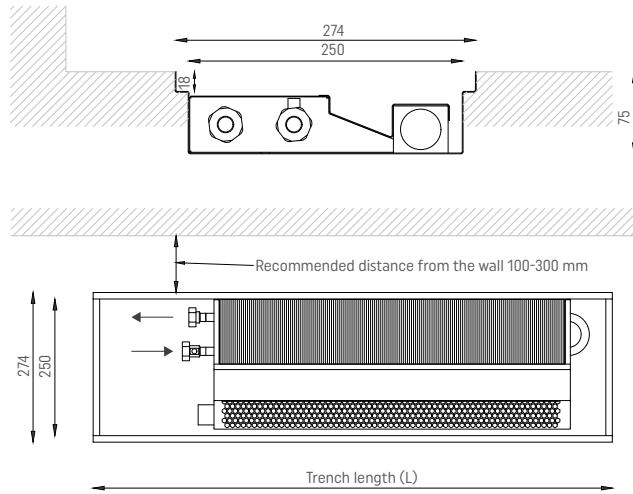


ORDER CODE

DIMENSIONS	[mm]
Trench height (H)	75
Trench bottom width (B)	250
Top width / Grille width (Bk)	274
Trench length (L)	950÷2750

CONNECTIONS	TYPE
Connectors	3/4" female thread
Connection side	Left (L) standard, Right (P) optional

ACCESSORIES	TYPE
Grille H=18 mm	roll-up / linear / modular
Frame	L or F



TRENCH LENGTH	OPERATING MODE	HEAT OUTPUT FOR t_s/t_r			ELECTRIC POWER DEMAND	CURRENT	NUMBER OF FAN MOTORS
		75/65 °C	55/45 °C	35/30 °C			
L [mm]	[-]	Φ [W]			P [W]	I [A]	[-]
950	Min	199	115	45	0,8	0,03	1
	Med	555	321	126	1,2	0,05	
	Max	871	504	197	2,2	0,09	
1100	Min	234	135	53	0,8	0,03	1
	Med	652	377	148	1,2	0,05	
	Max	1023	592	232	2,4	0,10	
1250	Min	300	174	68	0,8	0,03	1
	Med	836	484	189	1,2	0,05	
	Max	1312	759	297	2,7	0,11	
1450	Min	347	201	79	0,8	0,03	1
	Med	968	560	219	1,5	0,06	
	Max	1519	879	344	2,9	0,12	
1650	Min	398	230	90	1,5	0,06	2
	Med	1108	641	251	2,4	0,10	
	Max	1739	1006	394	4,4	0,18	
1800	Min	468	271	106	1,5	0,06	2
	Med	1303	754	295	2,4	0,10	
	Max	2045	1183	463	4,6	0,19	
2000	Min	499	289	113	1,5	0,06	2
	Med	1389	803	314	2,4	0,10	
	Max	2180	1261	493	4,8	0,20	
2150	Min	550	318	124	1,5	0,06	2
	Med	1531	886	346	2,7	0,11	
	Max	2403	1390	544	5,1	0,21	
2300	Min	599	346	136	1,5	0,06	2
	Med	1670	966	378	2,4	0,10	
	Max	2621	1516	593	5,3	0,22	
2500	Min	647	374	146	1,5	0,06	2
	Med	1804	1043	408	2,7	0,11	
	Max	2831	1637	641	5,6	0,23	
2750	Min	713	412	161	2,2	0,09	3
	Med	1986	1149	449	3,6	0,15	
	Max	3117	1803	705	7,0	0,29	

- Normative heating power output [W] compliant to EN-16430 for room temperature of $\Theta_a = 20^\circ\text{C}$.
- Control voltages for the respective modes of operation: Min - 2 V, Med - 4 V, Max - 6 V.
- Min, Med, Max fan speeds are for continuous operations.

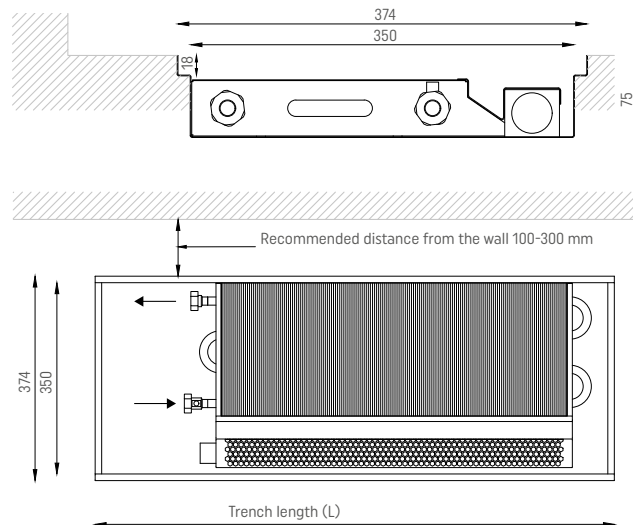


HEIGHT 75 mm

VKN5-7,5/35/L (L/P)

ORDER CODE

DIMENSIONS	[mm]
Trench height (H)	75
Trench bottom width (B)	350
Top width / Grille width (Bk)	374
Trench length (L)	950÷2750
CONNECTIONS	TYPE
Connectors	3/4" female thread
Connection side	Left (L) standard, Right (P) optional
ACCESSORIES	TYPE
Grille H=18 mm	roll-up / linear / modular
Frame	L or F



TRENCH LENGTH	OPERATING MODE	HEAT OUTPUT FOR t_s/t_r			ELECTRIC POWER DEMAND	CURRENT	NUMBER OF FAN MOTORS
		75/65 °C	55/45 °C	35/30 °C			
L [mm]	[-]	Φ [W]			P [W]	I [A]	[-]
950	Min	256	148	58	0,8	0,03	1
	Med	625	361	141	1,2	0,05	
	Max	993	574	225	2,2	0,09	
1100	Min	301	174	68	0,8	0,03	1
	Med	734	425	166	1,2	0,05	
	Max	1166	674	264	2,4	0,10	
1250	Min	386	223	87	0,8	0,03	1
	Med	941	545	213	1,2	0,05	
	Max	1496	865	339	2,7	0,11	
1450	Min	446	258	101	0,8	0,03	1
	Med	1090	630	247	1,5	0,06	
	Max	1731	1001	392	2,9	0,12	
1650	Min	511	296	116	1,5	0,06	2
	Med	1248	722	282	2,4	0,10	
	Max	1983	1147	449	4,4	0,18	
1800	Min	601	348	136	1,5	0,06	2
	Med	1468	849	332	2,4	0,10	
	Max	2332	1349	528	4,6	0,19	
2000	Min	641	371	145	1,5	0,06	2
	Med	1564	905	354	2,4	0,10	
	Max	2486	1438	563	4,8	0,20	
2150	Min	706	408	160	1,5	0,06	2
	Med	1725	998	390	2,7	0,11	
	Max	2740	1585	620	5,1	0,21	
2300	Min	770	445	174	1,5	0,06	2
	Med	1881	1088	426	2,4	0,10	
	Max	2988	1728	676	5,3	0,22	
2500	Min	832	481	188	1,5	0,06	2
	Med	2031	1175	460	2,7	0,11	
	Max	3227	1866	730	5,6	0,23	
2750	Min	916	530	207	2,2	0,09	3
	Med	2237	1294	506	3,6	0,15	
	Max	3554	2056	804	7,0	0,29	

- Normative heating power output [W] compliant to EN-16430 for room temperature of $\Theta_a = 20^\circ\text{C}$.
- Control voltages for the respective modes of operation: Min - 2 V, Med - 4 V, Max - 6 V.
- Min, Med, Max fan speeds are for continuous operations.



CORRECTIVE FACTORS FOR 75 MM HIGH VKN5 HEATERS

Heat output corrective factors for 75 mm high VKN5 units for installation temperatures other than 75/65/20°C.

SUPPLY AND RETURN TEMPERATURES [°C]		ROOM AIR TEMPERATURE θ_a [°C]						
t_s	t_r	5	8	12	16	20	24	32
90	85	1,710	1,644	1,555	1,467	1,379	1,292	1,118
	80	1,655	1,588	1,500	1,412	1,325	1,238	1,064
	75	1,600	1,533	1,445	1,358	1,270	1,183	1,011
	70	1,544	1,478	1,390	1,303	1,216	1,129	0,957
85	80	1,600	1,533	1,445	1,358	1,270	1,183	1,011
	75	1,544	1,478	1,390	1,303	1,216	1,129	0,957
	70	1,489	1,423	1,336	1,248	1,162	1,075	0,904
	65	1,434	1,368	1,281	1,194	1,108	1,021	0,851
80	75	1,489	1,423	1,336	1,248	1,162	1,075	0,904
	70	1,434	1,368	1,281	1,194	1,108	1,021	0,851
	65	1,379	1,314	1,227	1,140	1,054	0,968	0,798
	60	1,325	1,259	1,172	1,086	1,000	0,915	0,745
75	70	1,379	1,314	1,227	1,140	1,054	0,968	0,798
	65	1,325	1,259	1,172	1,086	1,000	0,915	0,745
	60	1,270	1,205	1,118	1,032	0,947	0,861	0,693
	55	1,216	1,151	1,064	0,979	0,893	0,808	0,641
70	65	1,270	1,205	1,118	1,032	0,947	0,861	0,693
	60	1,216	1,151	1,064	0,979	0,893	0,808	0,641
	55	1,162	1,097	1,011	0,925	0,840	0,756	0,589
	50	1,108	1,043	0,957	0,872	0,787	0,703	0,537
65	60	1,162	1,097	1,011	0,925	0,840	0,756	0,589
	55	1,108	1,043	0,957	0,872	0,787	0,703	0,537
	50	1,054	0,989	0,904	0,819	0,735	0,651	0,486
	45	1,000	0,936	0,851	0,766	0,682	0,599	0,435
60	55	1,054	0,989	0,904	0,819	0,735	0,651	0,486
	50	1,000	0,936	0,851	0,766	0,682	0,599	0,435
	45	0,947	0,883	0,798	0,714	0,630	0,547	0,385
	40	0,893	0,830	0,745	0,661	0,578	0,496	0,335
55	50	0,947	0,883	0,798	0,714	0,630	0,547	0,385
	45	0,893	0,830	0,745	0,661	0,578	0,496	0,335
	40	0,840	0,777	0,693	0,609	0,527	0,445	0,285
	35	0,787	0,724	0,641	0,558	0,476	0,395	0,236
50	45	0,840	0,777	0,693	0,609	0,527	0,445	0,285
	40	0,787	0,724	0,641	0,558	0,476	0,395	0,236
	35	0,735	0,672	0,589	0,506	0,425	0,345	0,188
45	40	0,735	0,672	0,589	0,506	0,425	0,345	0,188
	35	0,682	0,620	0,537	0,455	0,375	0,295	0,140
40	35	0,63	0,568	0,486	0,405	0,325	0,246	0,094
	30	0,578	0,517	0,435	0,354	0,275	0,197	0,049
35	30	0,527	0,466	0,385	0,305	0,226	0,15	0,007

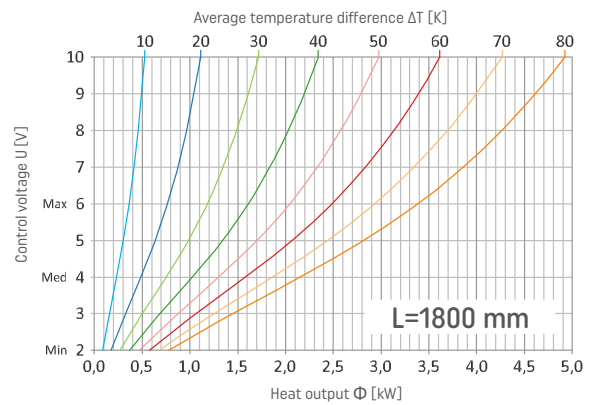
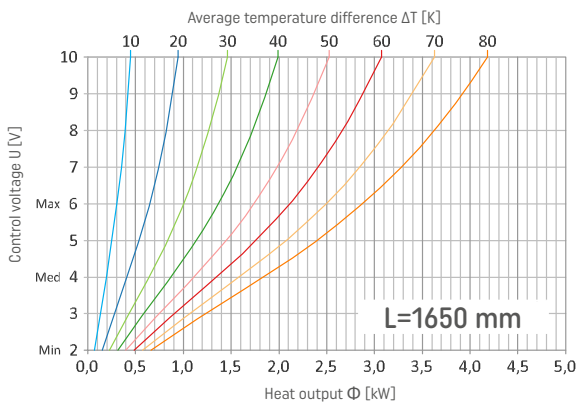
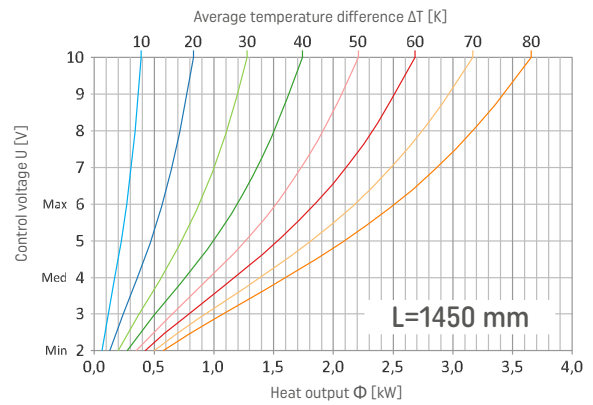
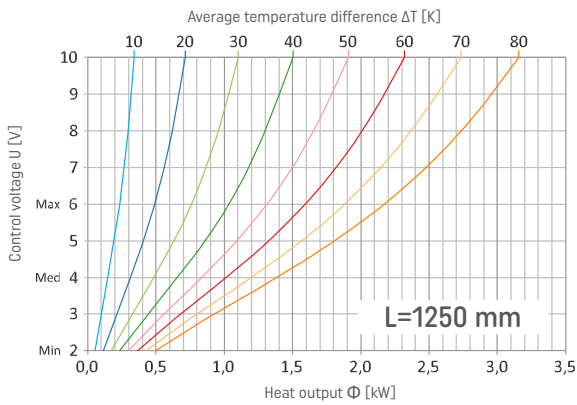
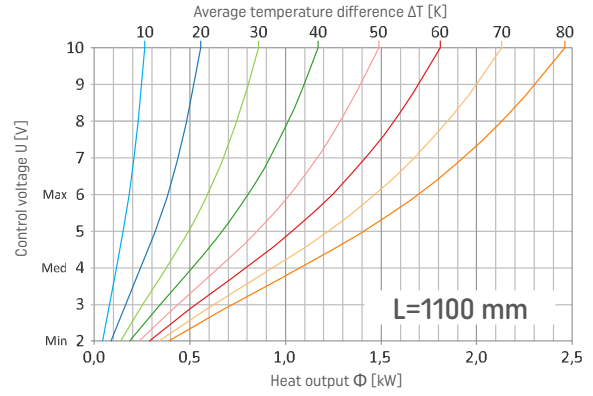
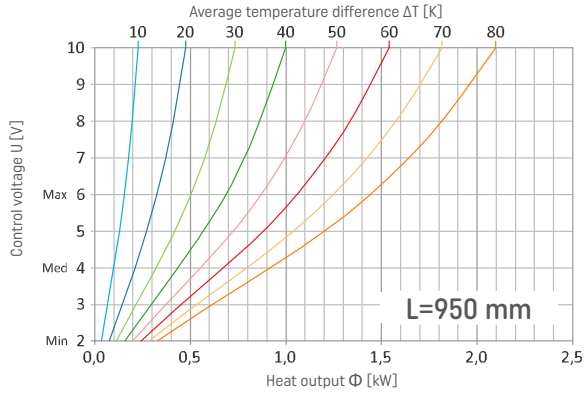
HEAT OUTPUT CORRECTIVE FACTORS FOR VKN HEATERS ACCORDING TO THE GRILLE TYPE

GRILLE TYPE	AIRFLOW	CORRECTIVE FACTOR
Roll-up double T-bar profile aluminium grille - 13 mm gap	67%	1,00
Roll-up double T-bar profile aluminium grille - 8 mm gap	63%	0,99
Roll-up closed profile aluminium grille	62%	1,00
Roll-up wooden grille	52%	0,98
Modular snap on profile aluminium grille	62%	0,97
Linear snap on profile aluminium grille	62%	1,08
Linear stainless steel grille	71%	1,09



HEAT OUTPUT OF VKN5-7,5/25/L

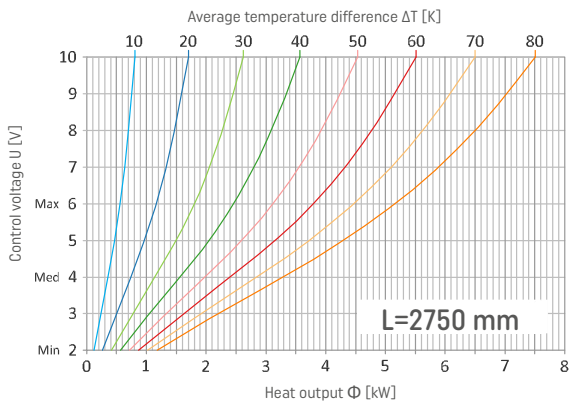
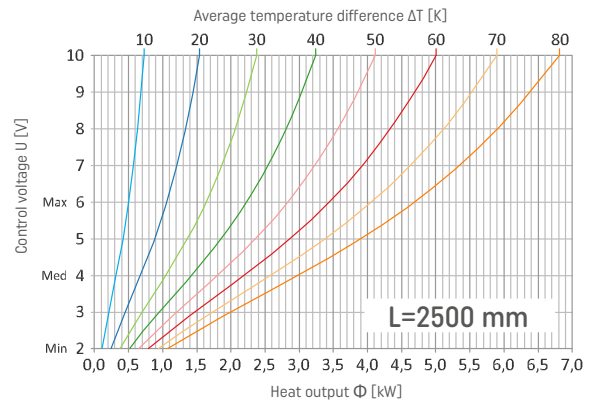
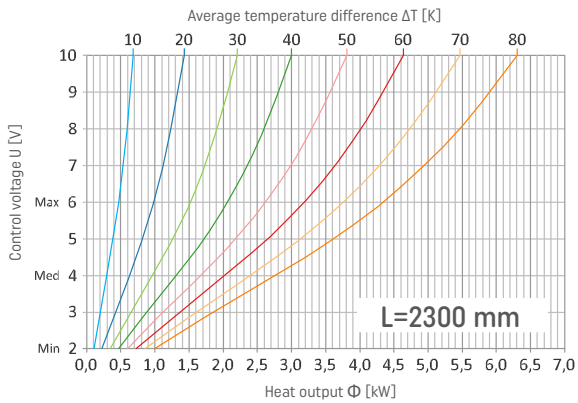
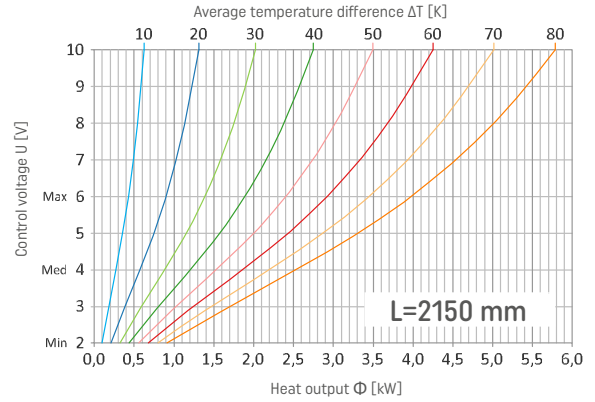
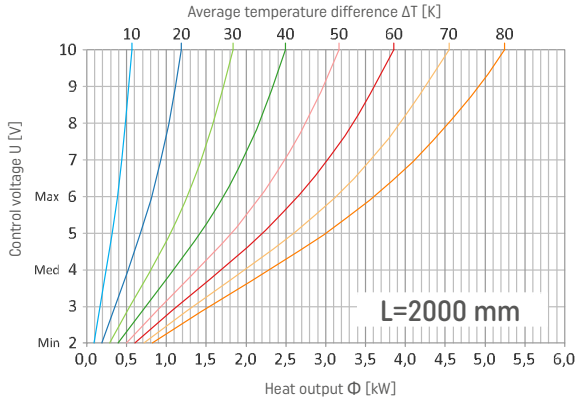
The graphs present how heat output Φ [kW] depends on the respective average temperature differences ΔT [K] for control voltages U [V].





HEAT OUTPUT OF VKN5-7,5/25/L

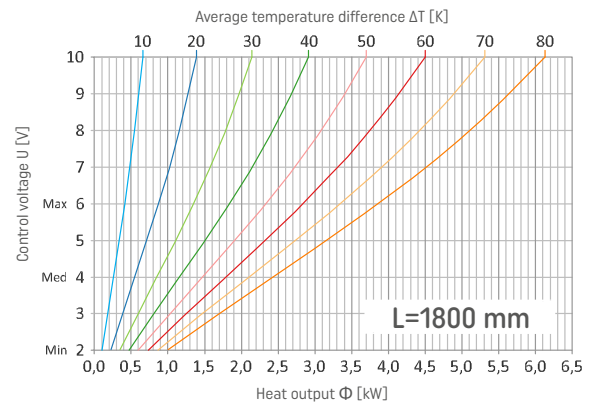
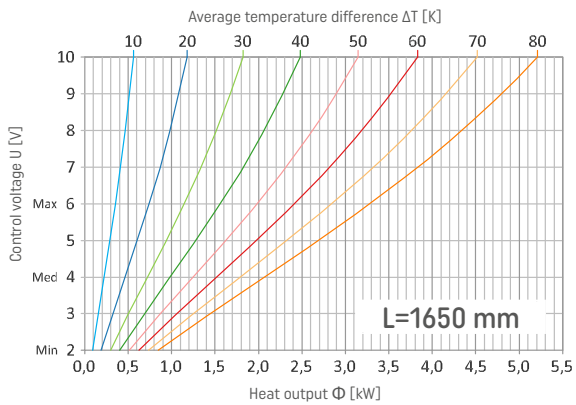
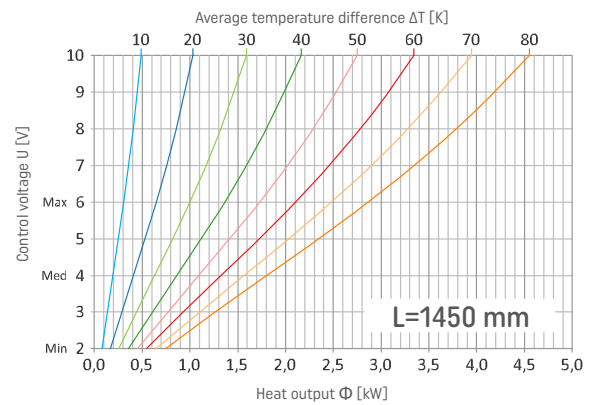
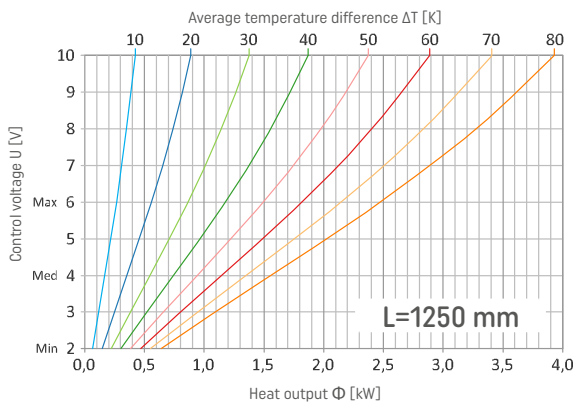
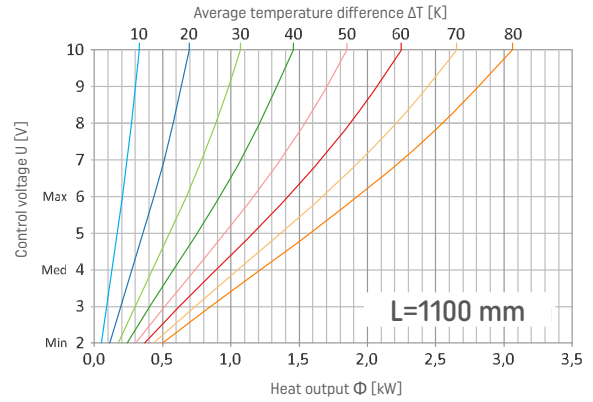
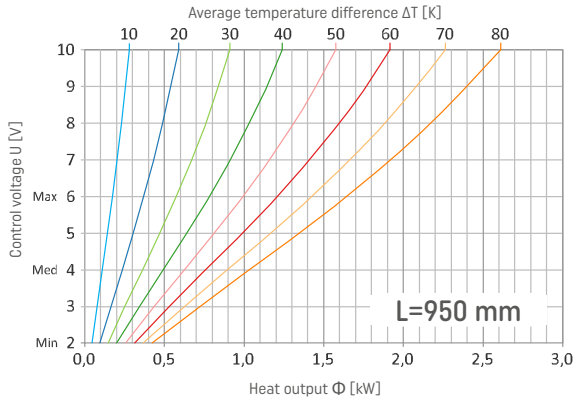
The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].





HEAT OUTPUT OF VKN5-7,5/35/L

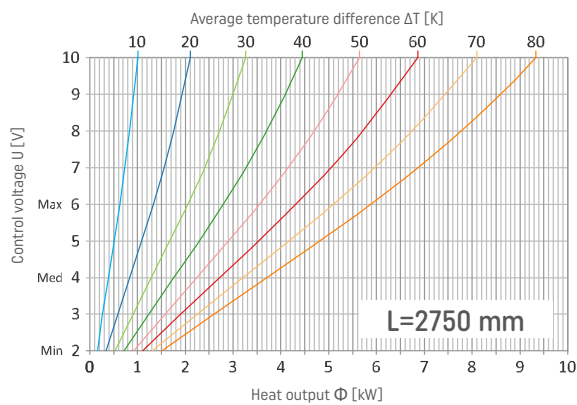
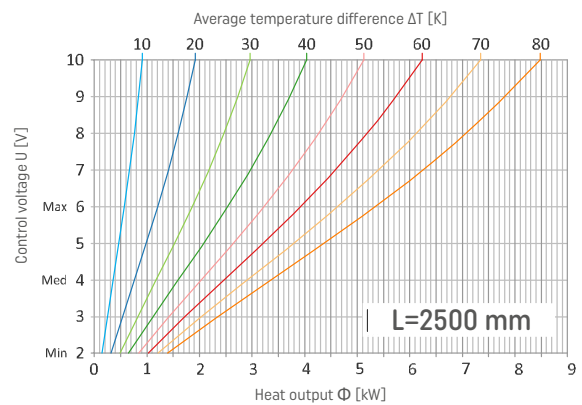
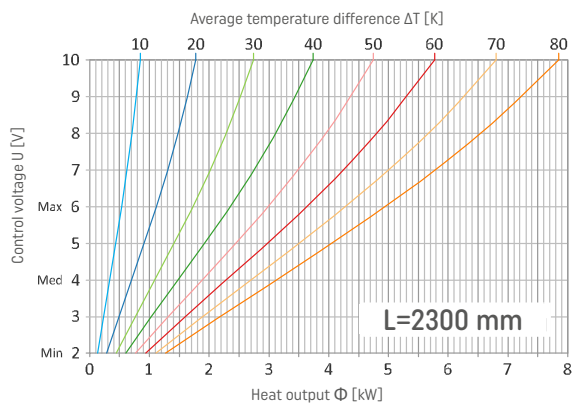
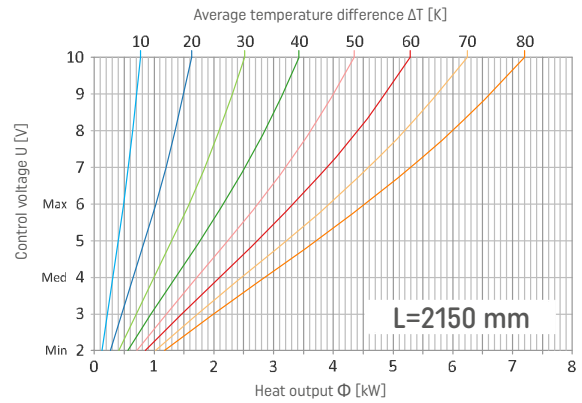
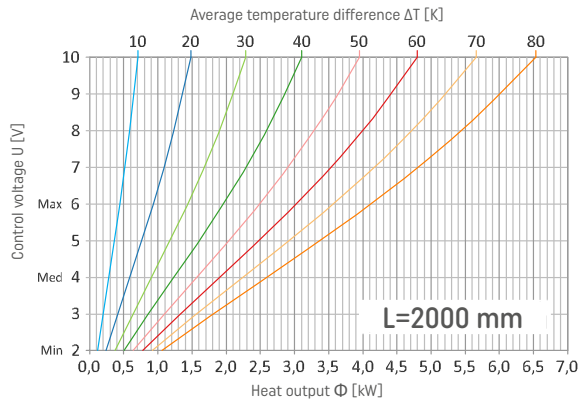
The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].





HEAT OUTPUT OF VKN5-7,5/35/L

The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].





HEIGHT 90 mm

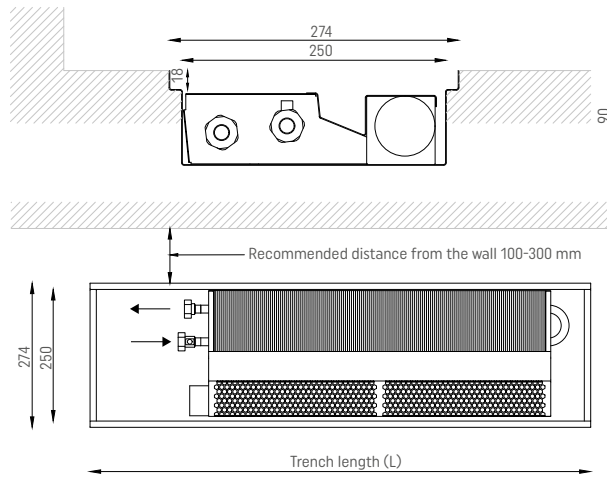
VKN5-9/25/L (L/P)

◀ ORDER CODE

DIMENSIONS	[mm]
Trench height (H)	90
Trench bottom width (B)	250
Top width / Grille width (Bk)	274
Trench length (L)	950÷2750

CONNECTIONS	TYPE
Connectors	3/4" female thread
Connection side	Left (L) standard, Right (P) optional

ACCESSORIES	TYPE
Grille H=18 mm	roll-up / linear / modular
Frame	L or F



TRENCH LENGTH	OPERATING MODE	HEAT OUTPUT FOR t_s/t_r			ELECTRIC POWER DEMAND	CURRENT	NUMBER OF FAN MOTORS
		75/65 °C	55/45 °C	35/30 °C			
L [mm]	[-]	Φ [W]			P [W]	I [A]	[-]
950	Min	542	313	123	1,0	0,04	1
	Med	1165	674	264	2,2	0,09	
	Max	1634	945	370	5,3	0,22	
1100	Min	637	368	144	1,0	0,04	1
	Med	1368	791	310	2,4	0,10	
	Max	1918	1109	434	6,0	0,25	
1250	Min	817	473	185	1,0	0,04	1
	Med	1755	1015	397	2,7	0,11	
	Max	2461	1423	557	7,2	0,30	
1450	Min	946	547	214	1,2	0,05	1
	Med	2032	1175	460	2,9	0,12	
	Max	2849	1648	645	8,2	0,34	
1650	Min	1083	626	245	2,0	0,08	2
	Med	2326	1345	526	4,4	0,18	
	Max	3262	1887	738	10,6	0,44	
1800	Min	1274	737	288	2,0	0,08	2
	Med	2736	1582	619	4,6	0,19	
	Max	3836	2219	868	11,3	0,47	
2000	Min	1358	785	307	2,0	0,08	2
	Med	2916	1687	660	4,8	0,20	
	Max	4090	2366	926	12,5	0,52	
2150	Min	1497	866	339	2,2	0,09	2
	Med	3215	1860	728	5,1	0,21	
	Max	4508	2607	1020	13,5	0,56	
2300	Min	1632	944	369	2,0	0,08	2
	Med	3506	2028	793	5,3	0,22	
	Max	4917	2844	1113	14,4	0,60	
2500	Min	1763	1020	399	2,2	0,09	2
	Med	3787	2190	857	5,6	0,23	
	Max	5310	3071	1202	15,4	0,64	
2750	Min	1941	1123	439	2,9	0,12	3
	Med	4170	2412	944	7,0	0,29	
	Max	5847	3382	1323	17,8	0,74	

- Normative heating power output [W] compliant to EN-16430 for room temperature of $\Theta_a = 20^\circ\text{C}$.
- Control voltages for the respective modes of operation: Min - 2 V, Med - 4 V, Max - 6 V.
- Min, Med, Max fan speeds are for continuous operations.



HEIGHT 90 mm

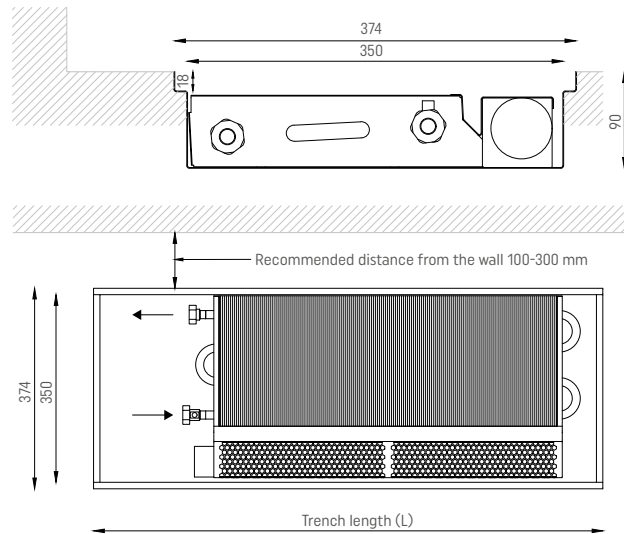
VKN5-9/35/L (L/P)

« ORDER CODE

DIMENSIONS	[mm]
Trench height (H)	90
Trench bottom width (B)	350
Top width / Grille width (Bk)	374
Trench length (L)	950÷2750

CONNECTIONS	TYPE
Connectors	3/4" female thread
Connection side	Left (L) standard, Right (P) optional

ACCESSORIES	TYPE
Grille H=18 mm	roll-up / linear / modular
Frame	L or F



TRENCH LENGTH	OPERATING MODE	HEAT OUTPUT FOR t_a/t_r			ELECTRIC POWER DEMAND	CURRENT	NUMBER OF FAN MOTORS
		75/65 °C	55/45 °C Φ [W]	35/30 °C			
L [mm]	[-]				P [W]	I [A]	[-]
950	Min	698	404	158	1,0	0,04	1
	Med	1537	889	348	2,2	0,09	
	Max	2208	1277	500	5,3	0,22	
1100	Min	819	474	185	1,0	0,04	1
	Med	1805	1044	408	2,4	0,10	
	Max	2592	1499	587	6,0	0,25	
1250	Min	1051	608	238	1,0	0,04	1
	Med	2315	1339	524	2,7	0,11	
	Max	3326	1924	753	7,2	0,30	
1450	Min	1217	704	275	1,2	0,05	1
	Med	2680	1550	607	2,9	0,12	
	Max	3850	2227	871	8,2	0,34	
1650	Min	1394	806	315	2,0	0,08	2
	Med	3069	1775	695	4,4	0,18	
	Max	4409	2550	998	10,6	0,44	
1800	Min	1639	948	371	2,0	0,08	2
	Med	3609	2087	817	4,6	0,19	
	Max	5185	2999	1173	11,3	0,47	
2000	Min	1747	1010	395	2,0	0,08	2
	Med	3847	2225	871	4,8	0,20	
	Max	5527	3197	1251	12,5	0,52	
2150	Min	1926	1114	436	2,2	0,09	2
	Med	4241	2453	960	5,1	0,21	
	Max	6093	3524	1379	13,5	0,56	
2300	Min	2101	1215	475	2,0	0,08	2
	Med	4626	2676	1047	5,3	0,22	
	Max	6645	3843	1504	14,4	0,60	
2500	Min	2269	1312	514	2,2	0,09	2
	Med	4995	2889	1130	5,6	0,23	
	Max	7176	4151	1624	15,4	0,64	
2750	Min	2498	1445	565	2,9	0,12	3
	Med	5501	3182	1245	7,0	0,29	
	Max	7903	4571	1789	17,8	0,74	

- Normative heating power output [W] compliant to EN-16430 for room temperature of $\theta_a = 20^\circ\text{C}$.
- Control voltages for the respective modes of operation: Min - 2 V, Med - 4 V, Max - 6 V.
- Min, Med, Max fan speeds are for continuous operations.



CORRECTIVE FACTORS FOR 90 MM HIGH VKN5 HEATERS

Heat output corrective factors for 90 mm high VKN5 units for installation temperatures other than 75/65/20°C.

SUPPLY AND RETURN TEMPERATURES [°C]		ROOM AIR TEMPERATURE θ_a [°C]						
t_s	t_r	5	8	12	16	20	24	32
90	85	1,710	1,644	1,555	1,467	1,379	1,292	1,118
	80	1,655	1,588	1,500	1,412	1,325	1,238	1,064
	75	1,600	1,533	1,445	1,358	1,270	1,183	1,011
	70	1,544	1,478	1,390	1,303	1,216	1,129	0,957
85	80	1,600	1,533	1,445	1,358	1,270	1,183	1,011
	75	1,544	1,478	1,390	1,303	1,216	1,129	0,957
	70	1,489	1,423	1,336	1,248	1,162	1,075	0,904
	65	1,434	1,368	1,281	1,194	1,108	1,021	0,851
80	75	1,489	1,423	1,336	1,248	1,162	1,075	0,904
	70	1,434	1,368	1,281	1,194	1,108	1,021	0,851
	65	1,379	1,314	1,227	1,140	1,054	0,968	0,798
	60	1,325	1,259	1,172	1,086	1,000	0,915	0,745
75	70	1,379	1,314	1,227	1,140	1,054	0,968	0,798
	65	1,325	1,259	1,172	1,086	1,000	0,915	0,745
	60	1,270	1,205	1,118	1,032	0,947	0,861	0,693
	55	1,216	1,151	1,064	0,979	0,893	0,808	0,641
70	65	1,270	1,205	1,118	1,032	0,947	0,861	0,693
	60	1,216	1,151	1,064	0,979	0,893	0,808	0,641
	55	1,162	1,097	1,011	0,925	0,840	0,756	0,589
	50	1,108	1,043	0,957	0,872	0,787	0,703	0,537
65	60	1,162	1,097	1,011	0,925	0,840	0,756	0,589
	55	1,108	1,043	0,957	0,872	0,787	0,703	0,537
	50	1,054	0,989	0,904	0,819	0,735	0,651	0,486
	45	1,000	0,936	0,851	0,766	0,682	0,599	0,435
60	55	1,054	0,989	0,904	0,819	0,735	0,651	0,486
	50	1,000	0,936	0,851	0,766	0,682	0,599	0,435
	45	0,947	0,883	0,798	0,714	0,630	0,547	0,385
	40	0,893	0,830	0,745	0,661	0,578	0,496	0,335
55	50	0,947	0,883	0,798	0,714	0,630	0,547	0,385
	45	0,893	0,830	0,745	0,661	0,578	0,496	0,335
	40	0,840	0,777	0,693	0,609	0,527	0,445	0,285
	35	0,787	0,724	0,641	0,558	0,476	0,395	0,236
50	45	0,840	0,777	0,693	0,609	0,527	0,445	0,285
	40	0,787	0,724	0,641	0,558	0,476	0,395	0,236
	35	0,735	0,672	0,589	0,506	0,425	0,345	0,188
45	40	0,735	0,672	0,589	0,506	0,425	0,345	0,188
	35	0,682	0,620	0,537	0,455	0,375	0,295	0,140
40	35	0,630	0,568	0,486	0,405	0,325	0,246	0,094
	30	0,578	0,517	0,435	0,354	0,275	0,197	0,049
35	30	0,527	0,466	0,385	0,305	0,226	0,15	0,007

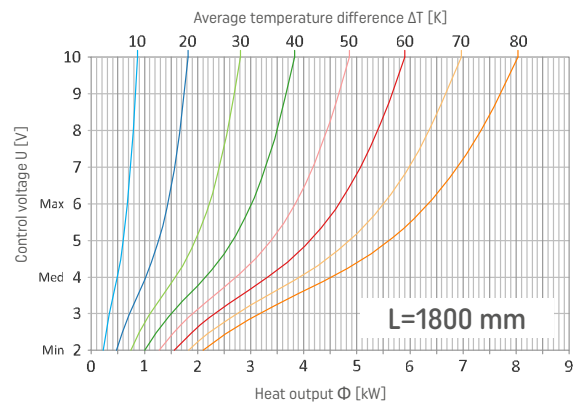
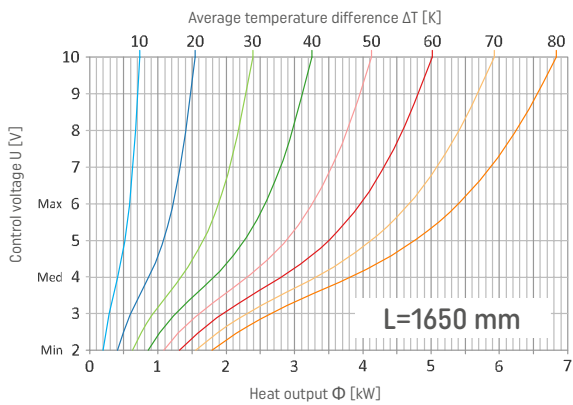
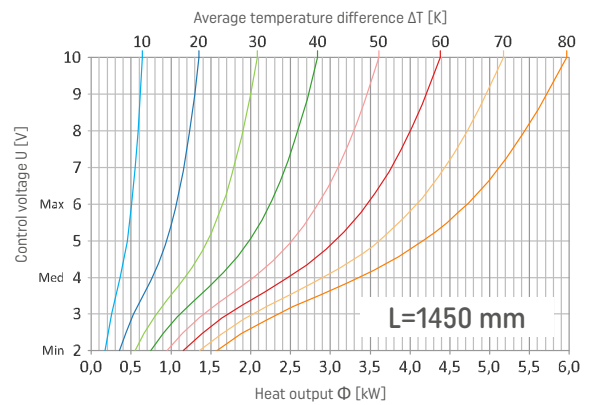
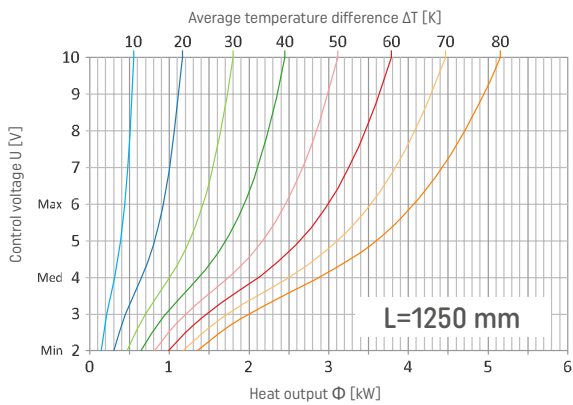
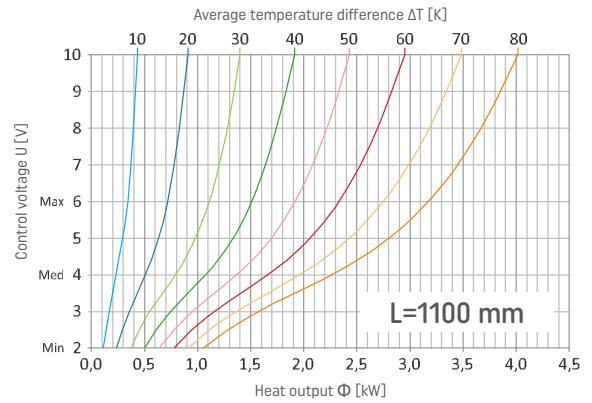
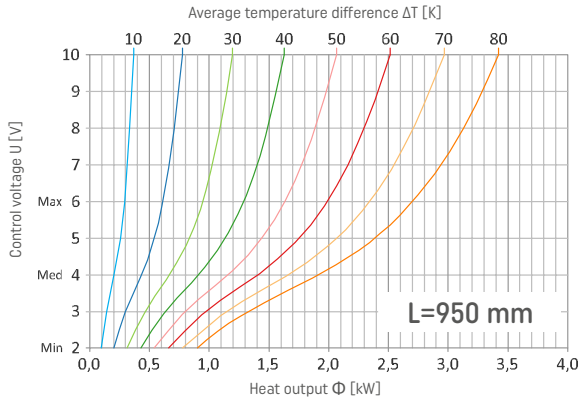
HEAT OUTPUT CORRECTIVE FACTORS FOR VKN HEATERS ACCORDING TO THE GRILLE TYPE

GRILLE TYPE	AIRFLOW	CORRECTIVE FACTOR
Roll-up double T-bar profile aluminium grille - 13 mm gap	67%	1,00
Roll-up double T-bar profile aluminium grille - 8 mm gap	63%	0,99
Roll-up closed profile aluminium grille	62%	1,00
Roll-up wooden grille	52%	0,98
Modular snap on profile aluminium grille	62%	0,97
Linear snap on profile aluminium grille	62%	1,08
Linear stainless steel grille	71%	1,09



HEAT OUTPUT OF VKN5-9/25/L

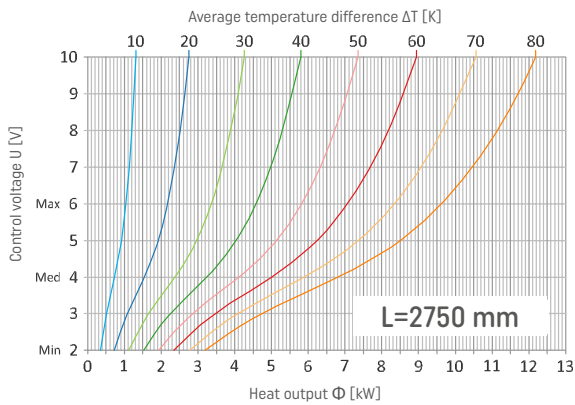
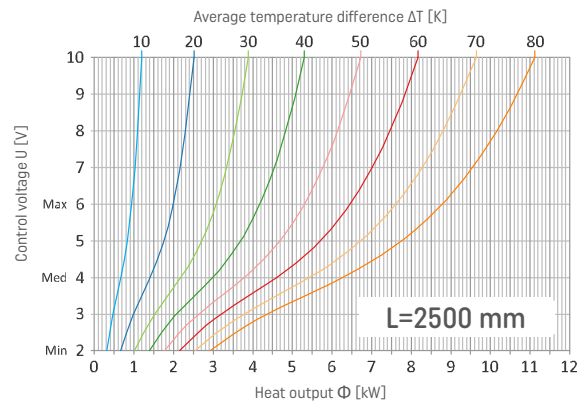
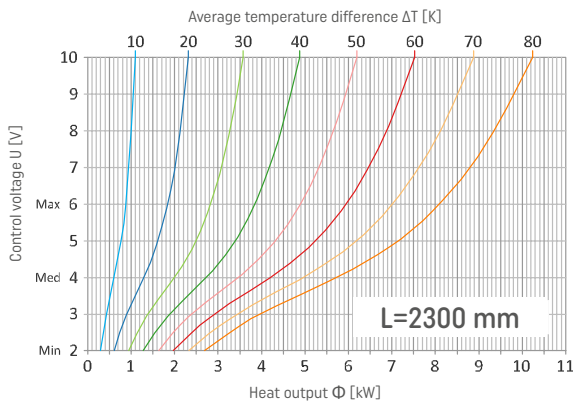
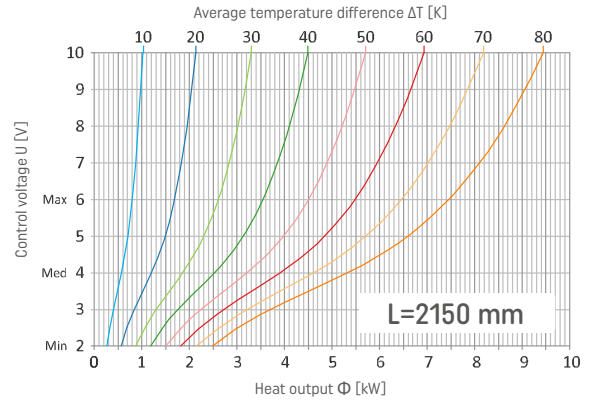
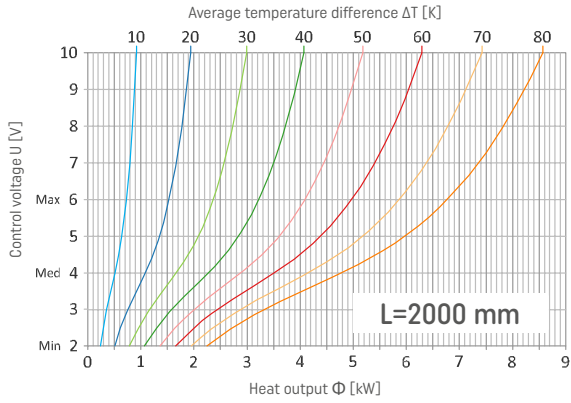
The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].





HEAT OUTPUT OF VKN5-9/25/L

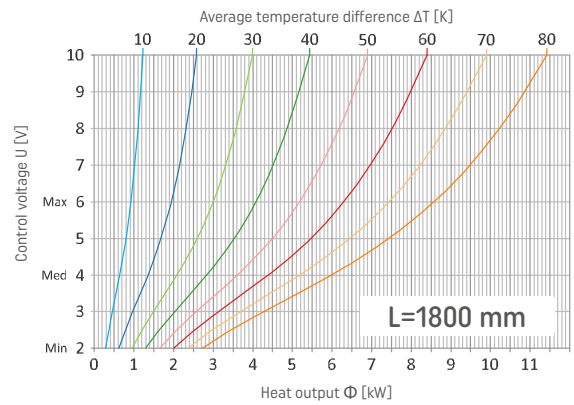
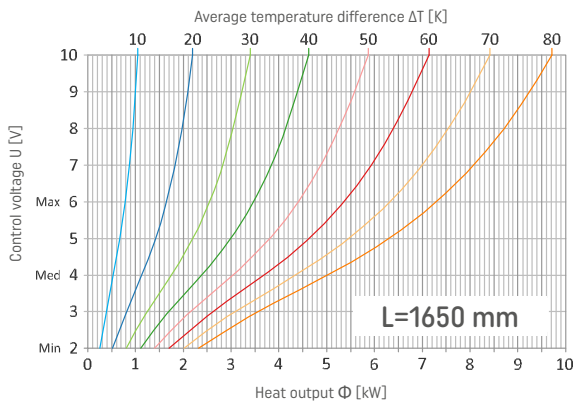
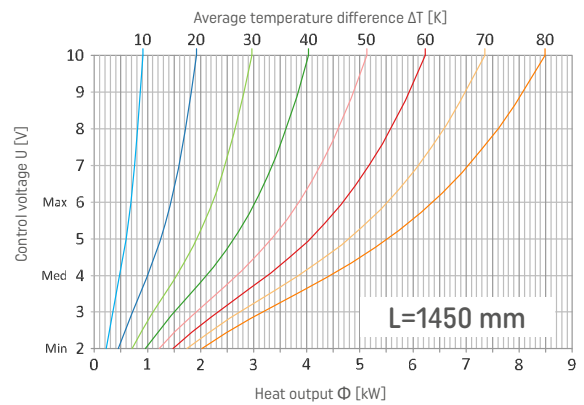
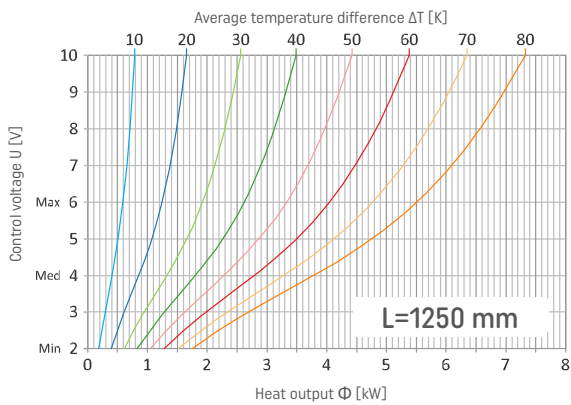
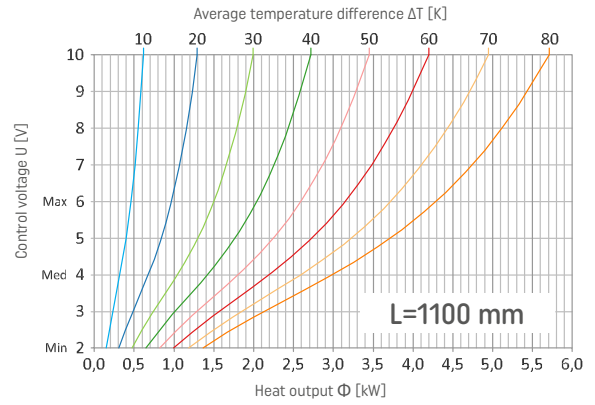
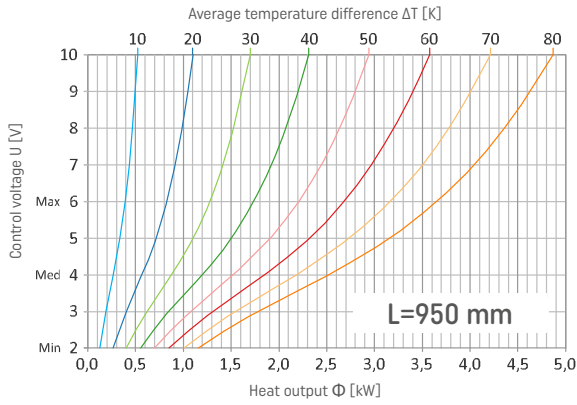
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HEAT OUTPUT OF VKN5-9/35/L

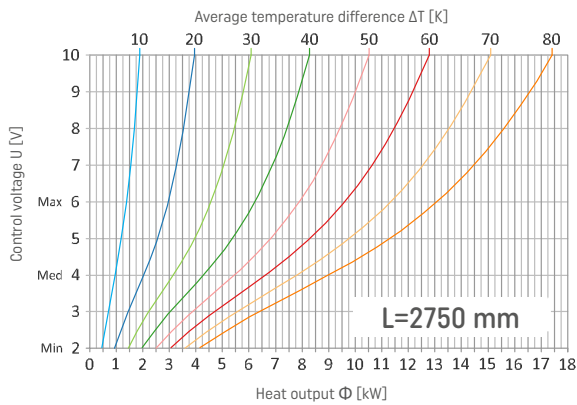
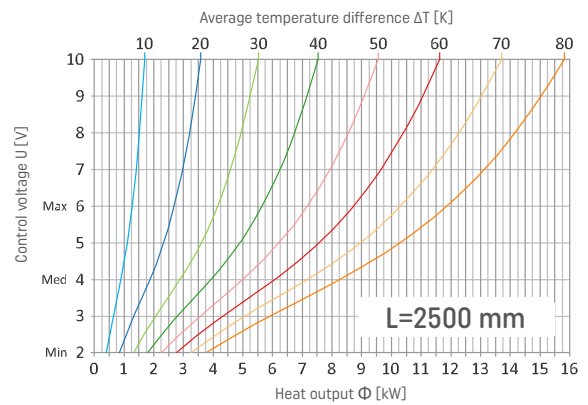
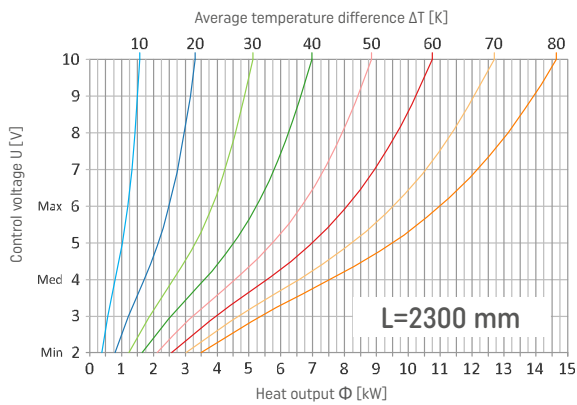
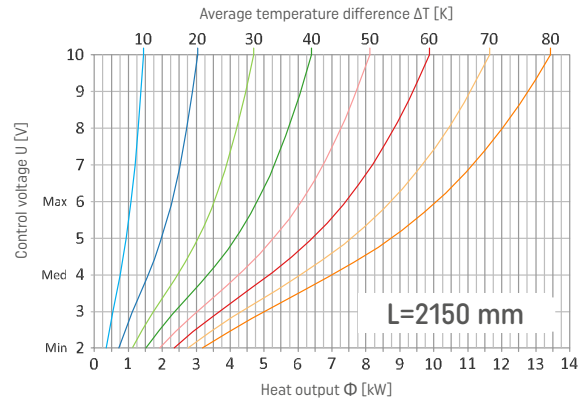
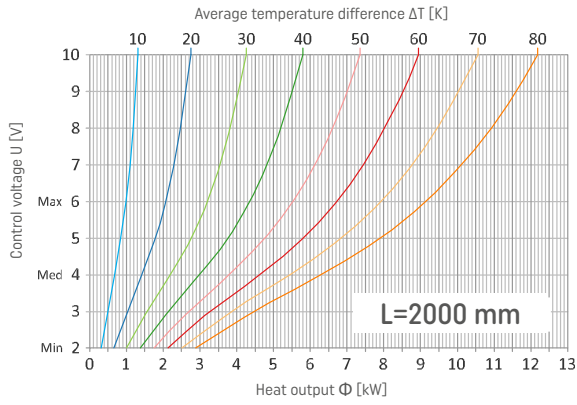
The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].





HEAT OUTPUT OF VKN5-9/35/L

The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].





HEIGHT 140 mm

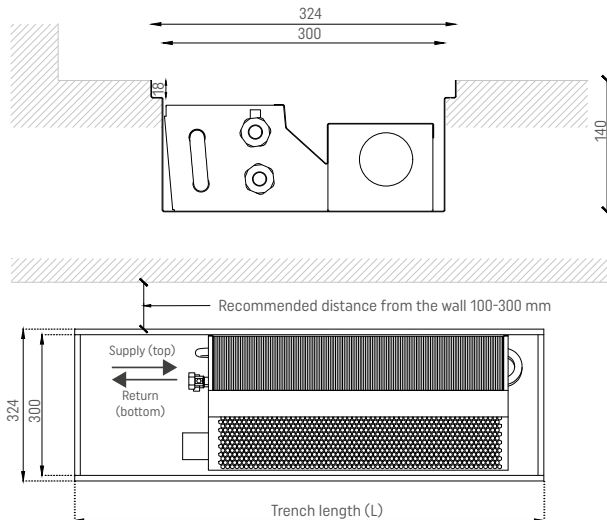
VKN5-14/30/L (L/P)

ORDER CODE

DIMENSIONS	[mm]
Trench height (H)	140
Trench bottom width (B)	300
Top width / Grille width (Bk)	324
Trench length (L)	800÷2700

CONNECTIONS	TYPE
Connectors	3/4" female thread
Connection side	Left (L) standard, Right (P) optional

ACCESSORIES	TYPE
Grille H=18 mm	roll-up / linear / modular
Frame	L or F



LOW PARAMETERS

TRENCH LENGTH	OPERATING MODE	HEAT OUTPUT FOR t_e/t_r			ELECTRIC POWER DEMAND	CURRENT	NUMBER OF FAN MOTORS
		55/45 °C	45/50 °C	35/30 °C			
L [mm]	[-]	Φ [W]			P [W]	I [A]	[-]
800	Min	420	312	170	0,8	0,03	1
	Med	758	563	306	1,7	0,07	
	Max	1078	800	435	4,1	0,17	
1000	Min	599	444	242	1,2	0,05	1
	Med	1081	802	436	2,7	0,11	
	Max	1536	1140	620	6,0	0,25	
1250	Min	850	631	343	1,5	0,06	1
	Med	1535	1139	619	3,2	0,13	
	Max	2180	1618	880	8,0	0,33	
1550	Min	1019	757	411	2,0	0,08	2
	Med	1840	1365	742	4,4	0,18	
	Max	2613	1940	1055	10,1	0,42	
1750	Min	1198	889	483	2,4	0,10	2
	Med	2162	1605	873	5,3	0,22	
	Max	3072	2280	1239	12,0	0,50	
2000	Min	1449	1075	585	2,7	0,11	2
	Med	2616	1941	1056	5,8	0,24	
	Max	3716	2758	1499	14,0	0,58	
2250	Min	1700	1262	686	2,9	0,12	2
	Med	3069	2278	1239	6,3	0,26	
	Max	4360	3235	1759	15,9	0,66	
2500	Min	1797	1333	725	3,6	0,15	3
	Med	3244	2407	1309	8,0	0,33	
	Max	4607	3419	1859	18,0	0,75	
2750	Min	2048	1520	826	3,9	0,16	3
	Med	3697	2744	1492	8,4	0,35	
	Max	5252	3898	2119	20,0	0,83	

- Normative heating power output [W] compliant to EN-16430 for room temperature of $\Theta_a = 20^\circ\text{C}$.
- Control voltages for the respective modes of operation: Min - 2 V, Med - 4 V, Max - 6 V.
- Min, Med, Max fan speeds are for continuous operations.



CORRECTIVE FACTORS FOR 140 MM HIGH VKN5 HEATERS

Heat output corrective factors for 140 mm high VKN5 units for installation temperatures other than 55/45/20°C.

SUPPLY AND RETURN TEMPERATURES [°C]		ROOM AIR TEMPERATURE θ_a [°C]						
t_s	t_r	5	8	12	16	20	24	32
90	85	2,854	2,746	2,603	2,460	2,318	2,176	1,892
	80	2,764	2,657	2,514	2,371	2,229	2,087	1,804
	75	2,675	2,567	2,425	2,282	2,140	1,998	1,716
	70	2,585	2,478	2,336	2,193	2,051	1,910	1,628
85	80	2,675	2,567	2,425	2,282	2,140	1,998	1,716
	75	2,585	2,478	2,336	2,193	2,051	1,910	1,628
	70	2,496	2,389	2,247	2,105	1,963	1,821	1,540
	65	2,407	2,300	2,158	2,016	1,874	1,733	1,452
80	75	2,496	2,389	2,247	2,105	1,963	1,821	1,540
	70	2,407	2,300	2,158	2,016	1,874	1,733	1,452
	65	2,318	2,211	2,069	1,927	1,786	1,645	1,365
	60	2,229	2,122	1,981	1,839	1,698	1,558	1,278
75	70	2,318	2,211	2,069	1,927	1,786	1,645	1,365
	65	2,229	2,122	1,981	1,839	1,698	1,558	1,278
	60	2,140	2,034	1,892	1,751	1,610	1,470	1,191
	55	2,051	1,945	1,804	1,663	1,522	1,382	1,104
70	65	2,140	2,034	1,892	1,751	1,610	1,470	1,191
	60	2,051	1,945	1,804	1,663	1,522	1,382	1,104
	55	1,963	1,857	1,716	1,575	1,435	1,295	1,017
	50	1,874	1,769	1,628	1,487	1,347	1,208	0,931
65	60	1,963	1,857	1,716	1,575	1,435	1,295	1,017
	55	1,874	1,769	1,628	1,487	1,347	1,208	0,931
	50	1,786	1,681	1,540	1,400	1,260	1,121	0,845
	45	1,698	1,593	1,452	1,313	1,173	1,035	0,759
60	55	1,786	1,681	1,540	1,400	1,260	1,121	0,845
	50	1,698	1,593	1,452	1,313	1,173	1,035	0,759
	45	1,610	1,505	1,365	1,225	1,087	0,948	0,674
	40	1,522	1,417	1,278	1,139	1,000	0,862	0,589
55	50	1,610	1,505	1,365	1,225	1,087	0,948	0,674
	45	1,522	1,417	1,278	1,139	1,000	0,862	0,589
	40	1,435	1,330	1,191	1,052	0,914	0,776	0,504
	35	1,347	1,243	1,104	0,965	0,828	0,691	0,420
50	45	1,435	1,330	1,191	1,052	0,914	0,776	0,504
	40	1,347	1,243	1,104	0,965	0,828	0,691	0,420
	35	1,260	1,156	1,017	0,879	0,742	0,606	0,337
45	40	1,260	1,156	1,017	0,879	0,742	0,606	0,337
	35	1,173	1,069	0,931	0,793	0,657	0,521	0,254
40	35	1,087	0,983	0,845	0,708	0,572	0,437	0,172
	30	1,000	0,897	0,759	0,623	0,487	0,353	0,092
35	30	0,914	0,811	0,674	0,538	0,404	0,271	0,014

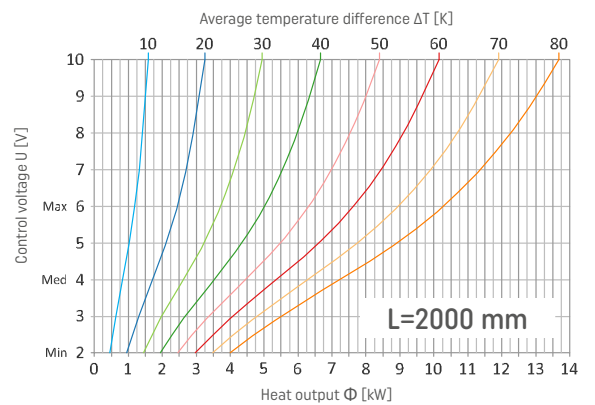
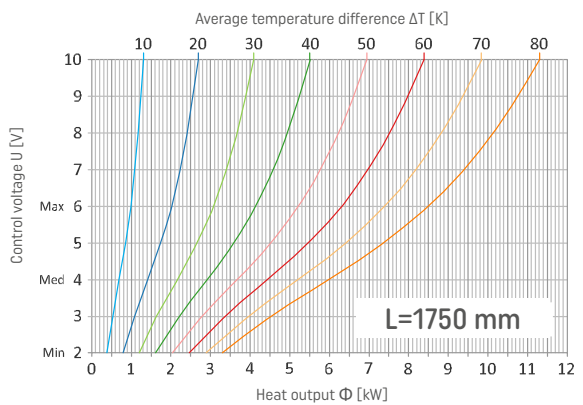
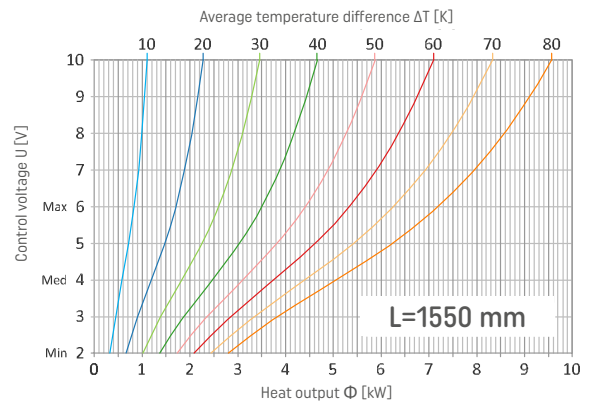
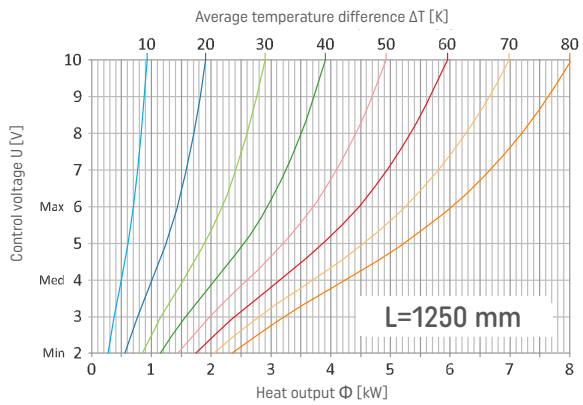
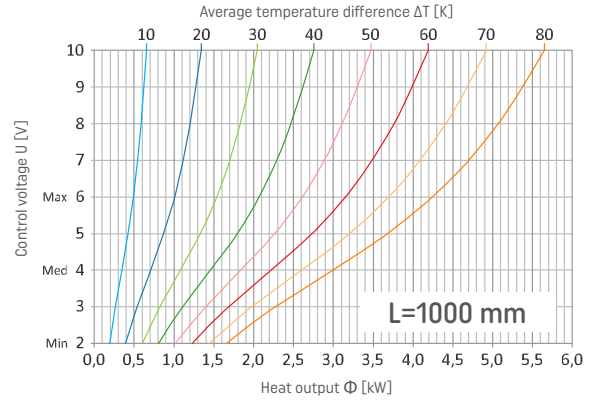
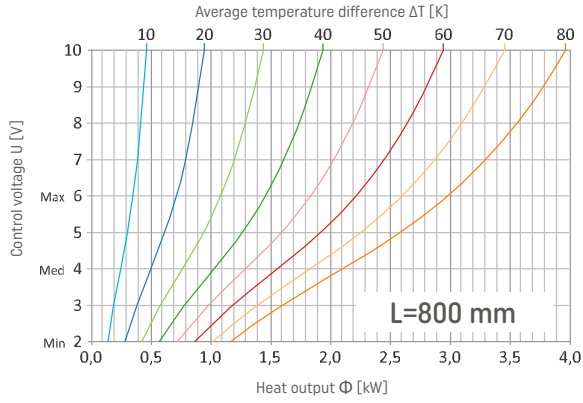
HEAT OUTPUT CORRECTIVE FACTORS FOR VKN HEATERS ACCORDING TO THE GRILLE TYPE

GRILLE TYPE	AIRFLOW	CORRECTIVE FACTOR
Roll-up double T-bar profile aluminium grille - 13 mm gap	67%	1,00
Roll-up double T-bar profile aluminium grille - 8 mm gap	63%	0,99
Roll-up closed profile aluminium grille	62%	1,00
Roll-up wooden grille	52%	0,98
Modular snap on profile aluminium grille	62%	0,97
Linear snap on profile aluminium grille	62%	1,08
Linear stainless steel grille	71%	1,09



HEAT OUTPUT OF VKN5 14/30/L

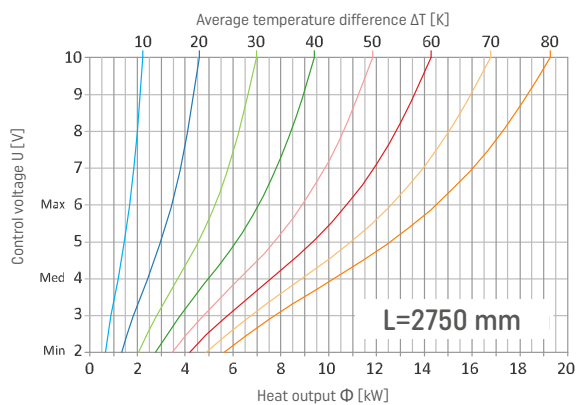
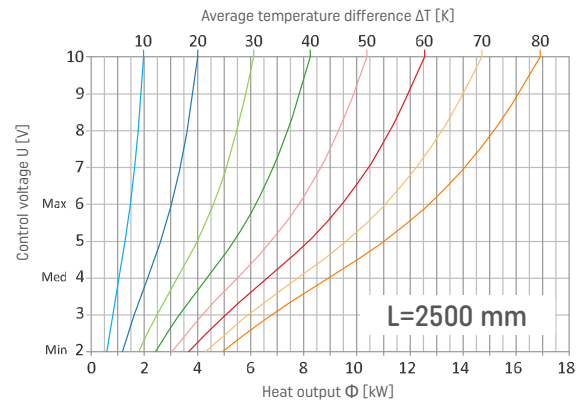
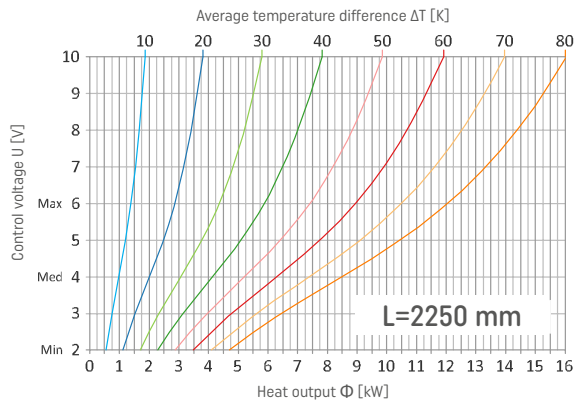
The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].





HEAT OUTPUT OF VKN5 14/30/L

The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].



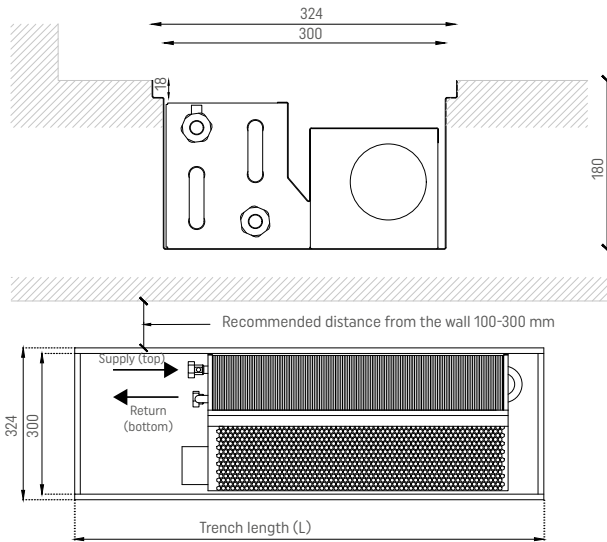


HEIGHT 180 mm

VKN5-18/30/L (L/P)

◀ ORDER CODE

DIMENSIONS	[mm]
Trench height (H)	180
Trench bottom width (B)	300
Top width / Grille width (Bk)	324
Trench length (L)	800÷2700
CONNECTIONS	TYPE
Connectors	3/4" female thread
Connection side	Left (L) standard, Right (P) optional
ACCESSORIES	TYPE
Grille H=18 mm	roll-up / linear / modular
Frame	L or F



LOW PARAMETERS

Trench length L [mm]	OPERATING MODE [-]	HEAT OUTPUT FOR t_e/t_r			ELECTRIC POWER DEMAND P [W]	CURRENT I [A]	NUMBER OF FAN MOTORS [-]
		55/45 °C	45/50 °C Φ [W]	35/30 °C			
800	Min	816	608	334	2,0	0,08	1
	Med	1492	1112	611	3,9	0,16	
	Max	2013	1501	825	7,5	0,31	
1000	Min	1149	857	471	2,2	0,09	1
	Med	2102	1567	861	4,4	0,18	
	Max	2837	2116	1162	8,9	0,37	
1250	Min	1594	1189	653	2,7	0,11	1
	Med	2915	2174	1194	6,5	0,27	
	Max	3935	2935	1612	14,4	0,60	
1550	Min	1964	1465	805	4,1	0,17	2
	Med	3593	2680	1472	8,2	0,34	
	Max	4850	3617	1987	16,4	0,68	
1750	Min	2298	1714	941	4,4	0,18	2
	Med	4203	3135	1722	8,7	0,36	
	Max	5674	4232	2324	17,8	0,74	
2000	Min	2743	2045	1123	4,8	0,20	2
	Med	5017	3742	2055	10,8	0,45	
	Max	6772	5051	2774	23,3	0,97	
2250	Min	3187	2377	1305	5,3	0,22	2
	Med	5830	4348	2388	13,0	0,54	
	Max	7871	5870	3224	28,8	1,20	
2500	Min	3447	2570	1412	6,3	0,26	3
	Med	6305	4702	2582	14,2	0,59	
	Max	8511	6347	3486	30,5	1,27	
2750	Min	3891	2902	1594	7,0	0,29	3
	Med	7119	5309	2916	15,2	0,63	
	Max	9610	7167	3936	32,2	1,34	

- Normative heating power output [W] compliant to EN-16430 for room temperature of $\Theta_a = 20^\circ\text{C}$.
- Control voltages for the respective modes of operation: Min - 2 V, Med - 4 V, Max - 6 V.
- Min, Med, Max fan speeds are for continuous operations.



CORRECTIVE FACTORS FOR 180 MM HIGH VKN5 HEATERS

Heat output corrective factors for 180 mm high VKN5 units for installation temperatures other than 55/45/20°C.

SUPPLY AND RETURN TEMPERATURES [°C]		ROOM AIR TEMPERATURE θ_a [°C]						
t_s	t_r	5	8	12	16	20	24	32
90	85	2,805	2,701	2,563	2,424	2,286	2,148	1,872
	80	2,718	2,615	2,476	2,338	2,200	2,062	1,786
	75	2,632	2,528	2,390	2,252	2,114	1,976	1,701
	70	2,545	2,442	2,303	2,165	2,027	1,890	1,615
85	80	2,632	2,528	2,390	2,252	2,114	1,976	1,701
	75	2,545	2,442	2,303	2,165	2,027	1,890	1,615
	70	2,459	2,355	2,217	2,079	1,941	1,804	1,529
	65	2,372	2,269	2,131	1,993	1,855	1,718	1,443
80	75	2,459	2,355	2,217	2,079	1,941	1,804	1,529
	70	2,372	2,269	2,131	1,993	1,855	1,718	1,443
	65	2,286	2,183	2,045	1,907	1,769	1,632	1,358
	60	2,200	2,096	1,958	1,821	1,683	1,546	1,273
75	70	2,286	2,183	2,045	1,907	1,769	1,632	1,358
	65	2,200	2,096	1,958	1,821	1,683	1,546	1,273
	60	2,114	2,010	1,872	1,735	1,598	1,461	1,187
	55	2,027	1,924	1,786	1,649	1,512	1,375	1,102
70	65	2,114	2,010	1,872	1,735	1,598	1,461	1,187
	60	2,027	1,924	1,786	1,649	1,512	1,375	1,102
	55	1,941	1,838	1,701	1,563	1,426	1,290	1,017
	50	1,855	1,752	1,615	1,478	1,341	1,204	0,932
65	60	1,941	1,838	1,701	1,563	1,426	1,290	1,017
	55	1,855	1,752	1,615	1,478	1,341	1,204	0,932
	50	1,769	1,666	1,529	1,392	1,255	1,119	0,847
	45	1,683	1,581	1,443	1,307	1,170	1,034	0,763
60	55	1,769	1,666	1,529	1,392	1,255	1,119	0,847
	50	1,683	1,581	1,443	1,307	1,170	1,034	0,763
	45	1,598	1,495	1,358	1,221	1,085	0,949	0,678
	40	1,512	1,409	1,273	1,136	1,000	0,864	0,594
55	50	1,598	1,495	1,358	1,221	1,085	0,949	0,678
	45	1,512	1,409	1,273	1,136	1,000	0,864	0,594
	40	1,426	1,324	1,187	1,051	0,915	0,780	0,510
	35	1,341	1,238	1,102	0,966	0,830	0,695	0,426
50	45	1,426	1,324	1,187	1,051	0,915	0,780	0,510
	40	1,341	1,238	1,102	0,966	0,830	0,695	0,426
	35	1,255	1,153	1,017	0,881	0,746	0,611	0,343
45	40	1,255	1,153	1,017	0,881	0,746	0,611	0,343
	35	1,170	1,068	0,932	0,797	0,661	0,527	0,260
40	35	1,085	0,983	0,847	0,712	0,577	0,443	0,177
	30	1,000	0,898	0,763	0,628	0,493	0,360	0,096
35	30	0,915	0,813	0,678	0,544	0,410	0,276	0,015

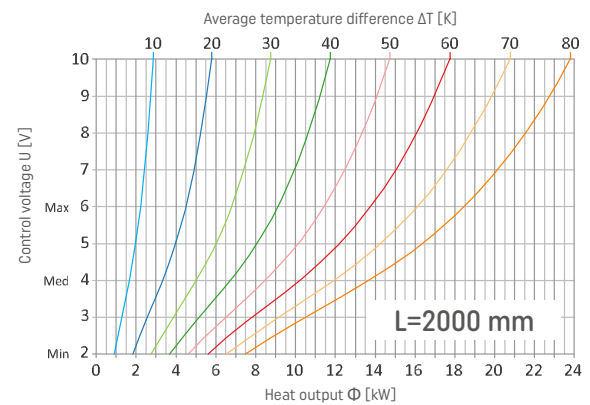
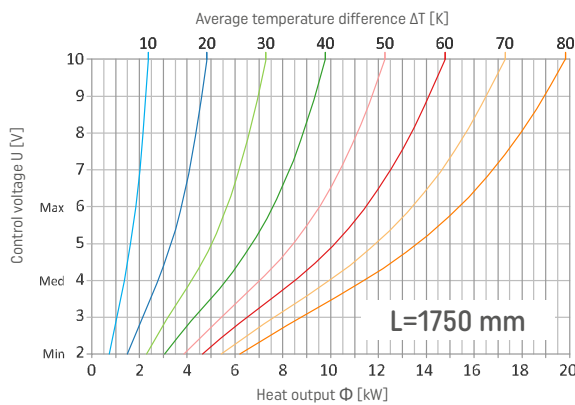
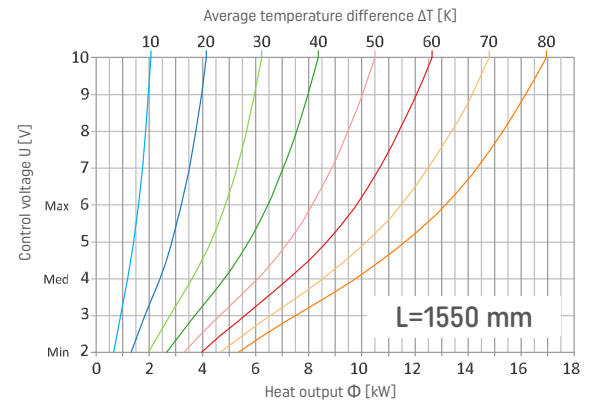
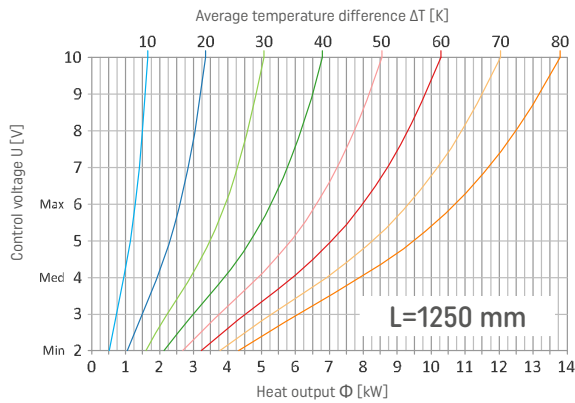
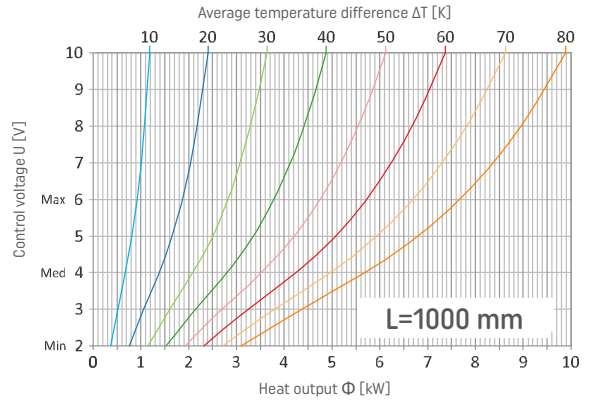
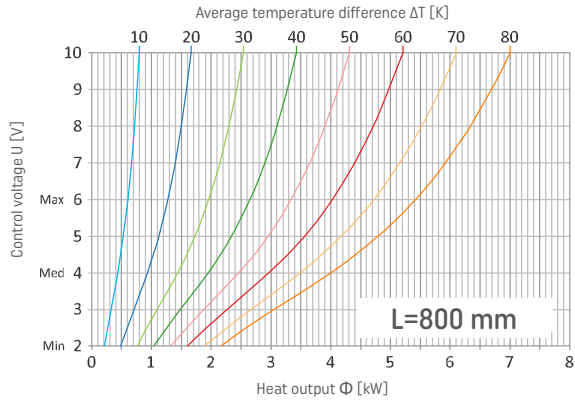
HEAT OUTPUT CORRECTIVE FACTORS FOR VKN HEATERS ACCORDING TO THE GRILLE TYPE

GRILLE TYPE	AIRFLOW	CORRECTIVE FACTOR
Roll-up double T-bar profile aluminium grille - 13 mm gap	67%	1,00
Roll-up double T-bar profile aluminium grille - 8 mm gap	63%	0,99
Roll-up closed profile aluminium grille	62%	1,00
Roll-up wooden grille	52%	0,98
Modular snap on profile aluminium grille	62%	0,97
Linear snap on profile aluminium grille	62%	1,08
Linear stainless steel grille	71%	1,09



HEAT OUTPUT OF VKN5 18/30/L

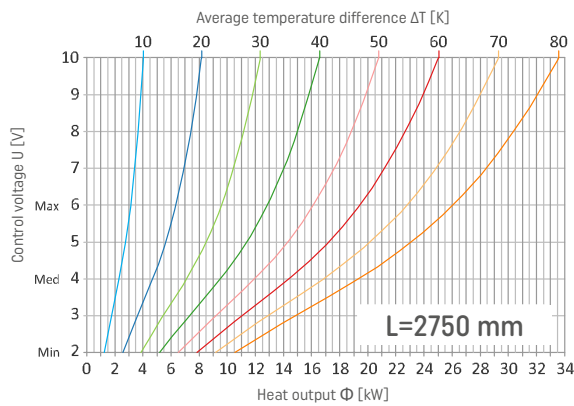
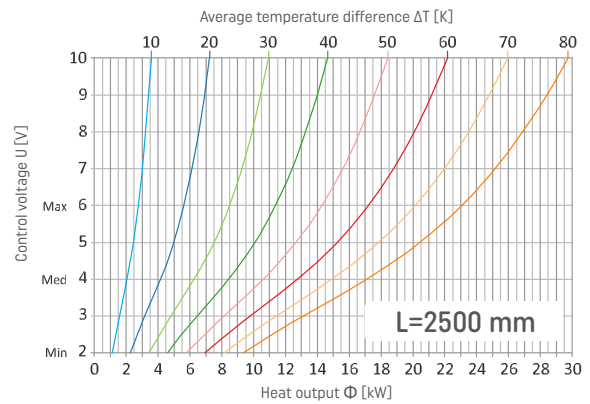
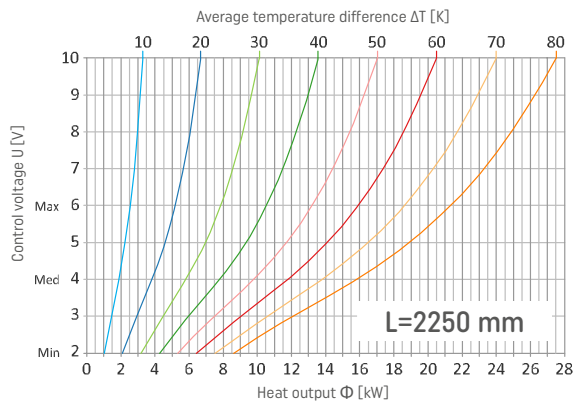
The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].





HEAT OUTPUT OF VKN5 18/30/L

The graphs present how heat output Φ [W] depends on the respective average temperature differences ΔT [K] for control voltages U [V].



VKN5 WATER CAPACITY

TRENCH LENGTH L [mm]	HEATER TYPE	
	VKN5-7,5/25/L	VKN5-7,5/35/L
	VKN5-9/25/L	VKN5-9/35/L
WATER CAPACITY [dm ³]		
950	0,25	0,53
1100	0,29	0,59
1250	0,35	0,73
1450	0,40	0,82
1650	0,47	0,96
1800	0,51	1,03
2000	0,57	1,16
2150	0,61	1,24
2300	0,67	1,36
2500	0,73	1,48
2750	0,79	1,61

TRENCH LENGTH L [mm]	HEATER TYPE	
	VKN5-14/35/L	VKN5-18/35/L
	WATER CAPACITY [dm ³]	
800	0,39	0,44
1000	0,50	0,56
1250	0,66	0,72
1550	0,84	0,90
1750	0,96	1,01
2000	1,12	1,17
2250	1,28	1,34
2500	1,41	1,47
2750	1,58	1,63

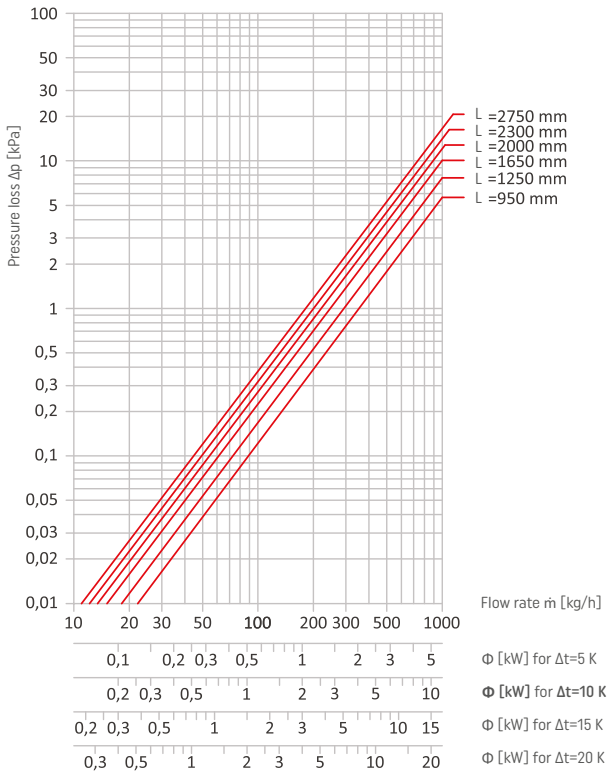
DECLARED PROPERTIES

Maximum permissible operating pressure:	1,0 MPa.
Test pressure:	1,3 MPa.
Maximum hydraulic pressure:	1,69 MPa.
Maximum operating temperature:	110°C

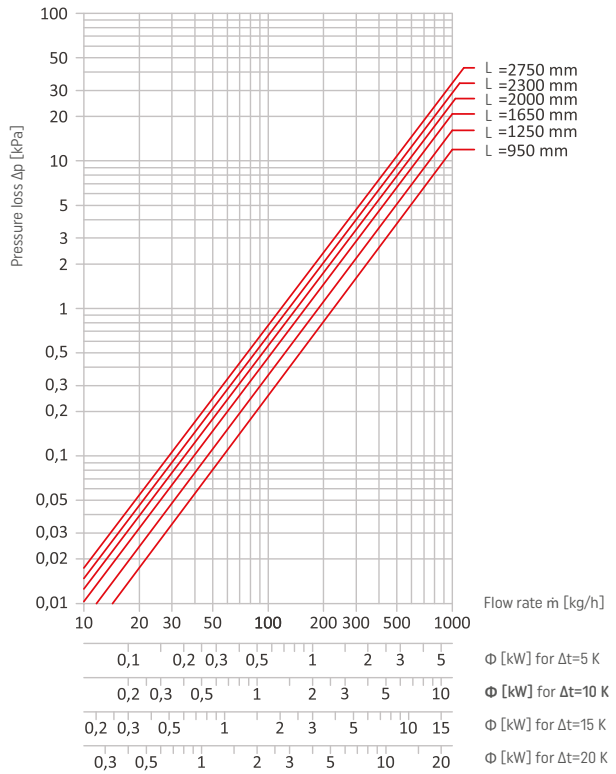


PRESSURE LOSS

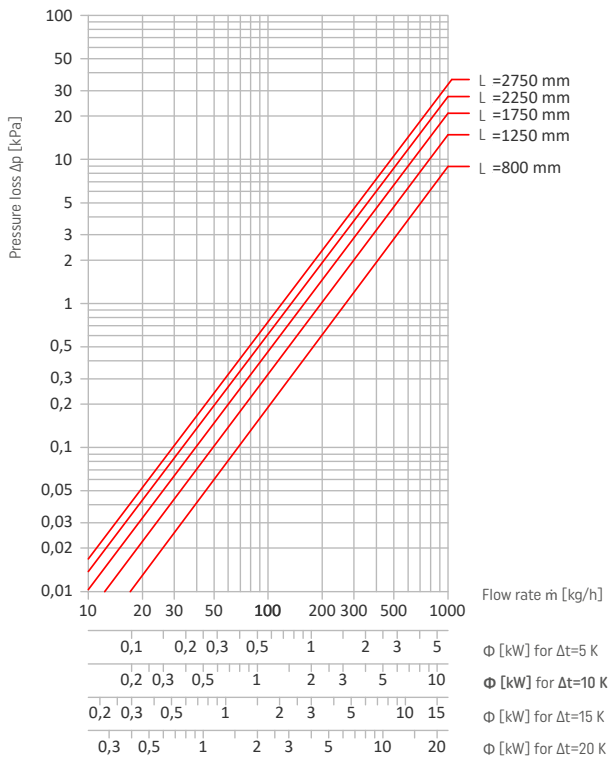
VKN5-7,5/25/L, VKN5-9/25/L



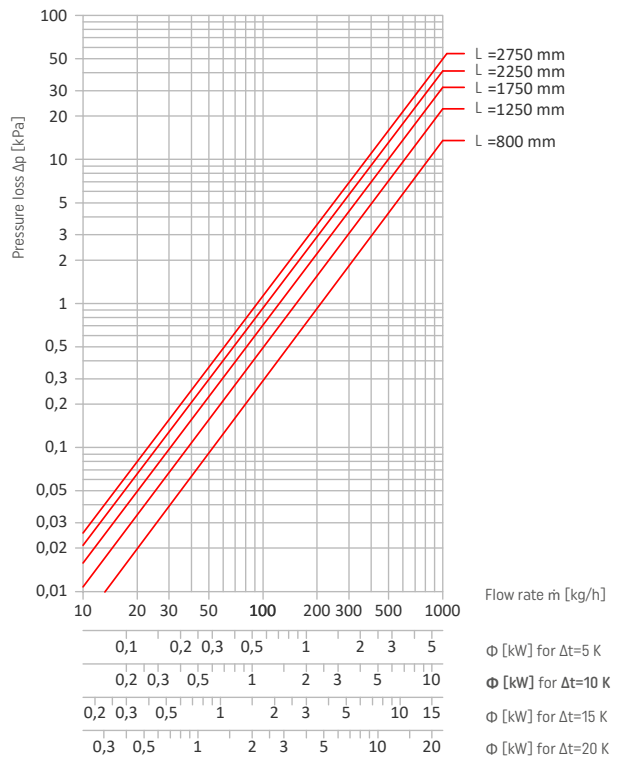
VKN5-7,5/35/L, VKN5-9/35/L



VKN5-14/30/L



VKN5-18/30/L





SOUND POWER AND SOUND PRESSURE LEVELS OF VKN1 AND VKN5 HEATERS

		SOUND POWER LEVEL Lw [dB(A)]			SOUND PRESSURE LEVEL Lw [dB(A)]			SOUND POWER LEVEL Lw [dB(A)]			SOUND PRESSURE LEVEL Lw [dB(A)]					
		Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max			
VKN1	6,5/14/	95	26	27	31	18	19	23	095	25	30	42	17	22	34	
		110	26	27	33	18	19	25	110	25	31	42	17	23	34	
		125	26	26	31	18	18	23	125	25	31	42	17	23	34	
		145	26	28	36	18	20	28	145	27	33	45	19	25	37	
		165	29	30	34	21	22	26	165	28	33	45	20	25	37	
		180	29	30	35	21	22	27	180	28	33	46	20	25	38	
	6,5/17/	200	29	29	34	21	21	26	200	28	34	45	20	26	37	
		95	26	29	39	18	21	31	215	29	35	47	21	27	39	
		110	26	27	34	18	19	26	230	28	34	45	20	26	37	
		125	26	29	35	18	21	27	250	28	35	46	20	27	38	
		145	25	26	34	17	18	26	275	30	36	48	22	28	40	
		165	29	32	42	21	24	34	095	27	31	42	19	23	34	
	9/14/	180	29	31	40	21	23	32	110	26	30	41	18	22	33	
		200	29	32	40	21	24	32	125	27	33	43	19	25	35	
		95	27	31	41	19	23	33	145	27	33	44	19	25	36	
		110	27	34	42	19	26	34	165	30	34	45	22	26	37	
		125	28	32	42	20	24	34	180	30	34	45	22	26	37	
		145	27	32	41	19	24	33	200	30	35	46	22	27	38	
	9/17/	165	31	34	44	23	26	36	215	30	35	46	22	27	38	
		180	31	36	45	23	28	37	230	30	36	46	22	28	38	
		200	31	35	45	23	27	37	250	30	36	46	22	28	38	
		95	26	33	43	18	25	35	275	30	36	47	22	28	39	
		110	28	34	44	20	26	36	095	28	34	46	20	26	38	
		125	26	33	42	18	25	34	110	28	36	46	20	28	38	
	VKN5	7,5/25/	145	29	34	44	21	26	36	125	29	34	46	21	26	38
			165	29	32	42	21	24	34	145	29	36	48	21	28	40
			180	29	31	40	21	23	32	165	31	37	49	23	29	41
			200	29	32	40	21	24	32	180	31	38	49	23	30	41
			95	27	31	41	19	23	33	200	31	37	49	23	29	41
			110	27	34	42	19	26	34	215	31	38	50	23	30	42
		7,5/35/	125	28	32	42	20	24	34	230	32	37	49	24	29	41
			145	27	32	41	19	24	33	250	32	38	50	24	30	42
			165	31	34	44	23	26	36	275	32	39	51	24	31	43
			180	31	36	45	23	28	37	095	27	34	47	19	26	39
			200	31	35	45	23	27	37	110	29	36	47	21	28	39
			95	26	33	43	18	25	35	125	28	35	49	20	27	41
		9/25/	110	28	34	44	20	26	36	145	29	36	49	21	28	41
			125	26	33	42	18	25	34	165	31	36	50	23	28	42
			145	29	34	44	21	26	36	180	31	38	51	23	30	43
			165	29	32	42	21	24	34	200	31	38	51	23	30	43
			180	29	31	40	21	23	32	215	32	39	51	24	31	43
			200	29	32	40	21	24	32	230	31	38	52	23	30	44
		9/35/	95	26	33	43	18	25	35	250	32	39	52	24	31	44
			110	28	34	44	20	26	36	275	32	39	52	24	31	44
			125	26	33	42	18	25	34	080	24	30	45	16	22	37
			145	29	34	44	21	26	36	100	27	36	49	19	28	41
			165	29	32	42	21	24	34	125	28	38	49	20	30	41
			180	29	31	40	21	23	32	155	29	37	51	21	29	43
14/30/		95	26	33	43	18	25	35	175	30	39	52	22	31	44	
		110	28	34	44	20	26	36	200	31	40	52	23	32	44	
		125	26	33	42	18	25	34	225	31	41	52	23	33	44	
		145	29	34	44	21	26	36	250	31	41	52	23	33	44	
		165	29	32	42	21	24	34	275	31	41	52	23	33	44	
		180	29	31	40	21	23	32	080	28	38	50	20	30	42	
18/30/		95	26	33	43	18	25	35	100	30	38	51	22	30	43	
		110	28	34	44	20	26	36	125	34	43	52	26	35	44	
		125	26	33	42	18	25	34	155	32	41	53	24	33	45	
		145	29	34	44	21	26	36	175	33	41	54	25	33	46	
		165	29	32	42	21	24	34	200	36	44	54	28	36	46	
		180	29	31	40	21	23	32	225	37	44	53	29	36	45	
95		26	33	43	18	25	35	250	37	44	53	29	36	45		
110		28	34	44	20	26	36	275	37	44	53	29	36	45		



HOW TO SELECT THE CORRECT HEATER

Exemplary calculations:

The calculated heat demand of a room is 680 W.

The design parameters for water supply and return and room temperature are (respectively):

$t_s/t_r/\theta_a = 55/45/20^\circ\text{C}$ (water parameters typical for low-temperature heat sources such as condensing gas boiler or heat pump).

METHOD 1

Read out the right conversion factor for project installation temperatures. In this case conversion factor is 0,600 (according to the table on page 9).

Next divide the calculated heat demand (680 W) by the read corrective factor (0,600). The result is the heat output (1135 W) for which we select the heater for the 75/65/20°C parameters.

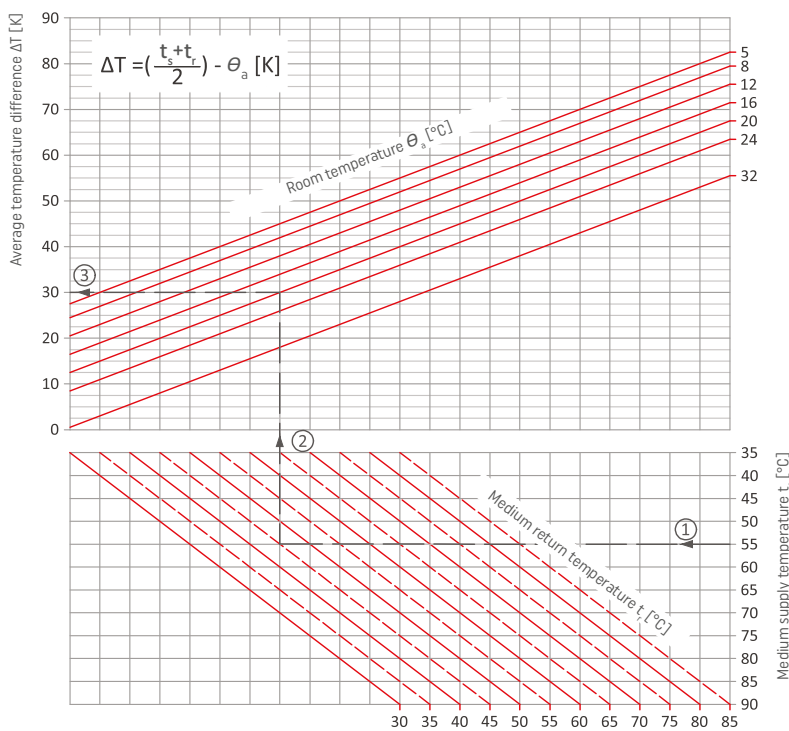
The last step is to select a heater with room-appropriate size, e.g. the **VKN1-6,5/17/110** model, which in the Med mode for 75/65/20°C parameters will reach the heat output of 1135 W, and 680 W for 55/45/20°C parameters.

METHOD 2

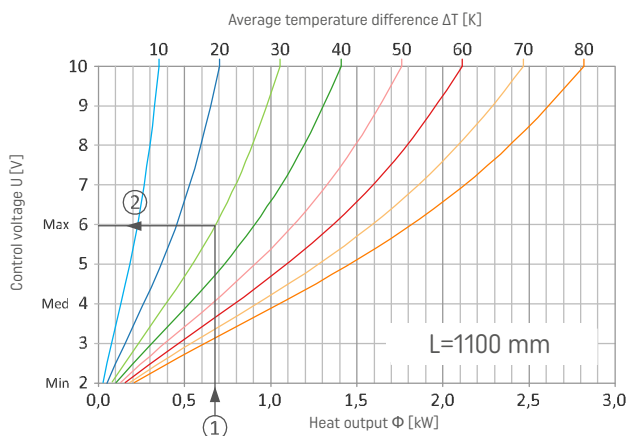
Using the graph below read/calculate the average temperature difference for selected temperatures.

The graph allows for easy readout of average temperature difference ΔT for selected heating media parameters t_s and t_r

depending on room temperature θ_a .



1. Draw a horizontal line from the supply temperature of $t_s=55^\circ\text{C}$ to the crossing point with the transverse line of returning water temperature $t_r=45^\circ\text{C}$
2. Draw a vertical line to the crossing point with the transverse room temperature line $\theta_a=20^\circ\text{C}$
3. Draw a horizontal line and read the average temperature difference $\Delta T=30\text{ K}$



Next, using the graphs from page no. 10 select a heater with appropriate parameters for that room. Always take the mode of fan operations into account.

1. Draw a vertical line from the calculated heating power demand (680 W) to the crossing point with the 30 K temperature difference curve.
2. Read the control voltage.

The selected **VKN1-6,5/17/110** heater reaches the assumed design parameters with a control voltage of $U=6\text{ V}$ (Max mode).



HOW TO SELECT THE CORRECT HEATER

METHOD 3

Based on **VERANO SELECT** selection programme: www.select.verano-global.com or scan the QR code:



RAIL POWER SUPPLY SELECTION

- Using the table included in the catalogue read the maximum power of electric fan of selected heater. Selection of power lower than the maximal will result in switching off fans in higher fan speed and may result in damage to power supply unit or fan motor. Maximum energy demand and current are to be read from the table for the Boost mode.
- Using the technical sheet of the selected actuator read its maximum electric power – e.g. 4,8 W / 0,2 A for the VERSST24 actuator.
- Using the technical sheet of the selected controller read its maximum electric power – e.g. 1,3 W / 0,06 A for VER-24 Wi-Fi and VER-24S controllers.
- Sum up all maximum powers and loads for all devices used (including multiple use of devices).
- After calculations select the smallest power supply unit that provides the required electric power.

EXAMPLE:

3 heaters were selected for a room according to its heat demand:

- 1 x VKN1-6,5/17/125,
- 2 x VKN1-6,5/17/165.

Additionally there are 3 VERSST24 thermal actuators and 1 VER-24 WI-Fi controller in the system.

Using the electric data for VKN1 heaters included on page no. 8 and the technical sheets of control devices we read:

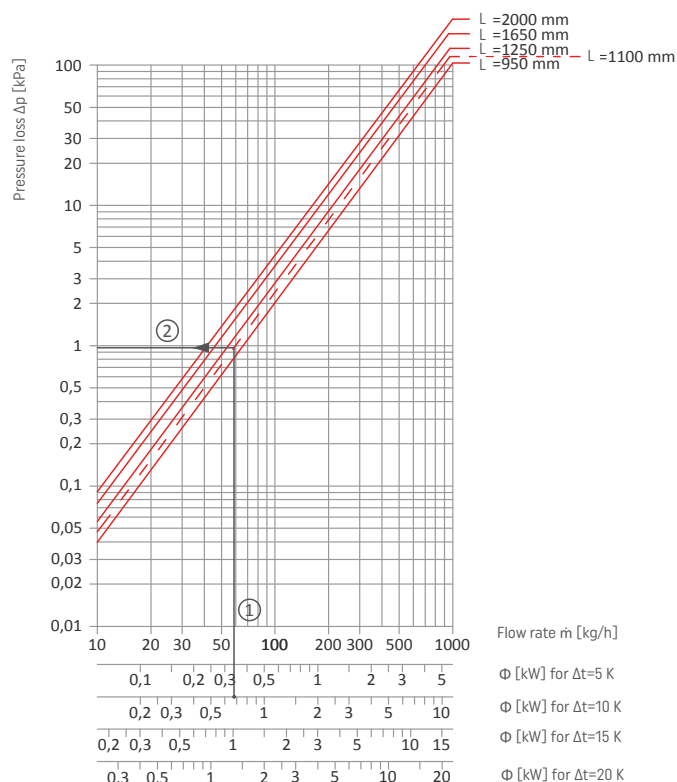
DEVICE TYPE	MAXIMUM ELECTRIC POWER DEMAND	MAXIMUM CURRENT
1 x VKN1-6,5/17/125 fan assisted trench heater	1 x 9,2 W	1 x 0,38 A
2 x VKN1-6,5/17/165 fan assisted trench heater	2 x 12 W	2 x 0,5 A
3 x VERSST24 thermal actuator	3 x 4,8 W	3 x 0,2 A
1 x VER-24 Wi-Fi room controller	1 x 1,3 W	1 x 0,06 A
TOTAL:	48,9 W	2,04 A

POWER SUPPLY UNIT SELECTED: Z060 24VDC (60 W / 2,5 A)

PRESSURE LOSS

Based on heater selection mode, as presented on page 43 we selected the VKN1-6,5/17/110 heater with a power of 680 W at fan voltage of 6V. Cooling down temperature of the heating medium is $\Delta t=10^{\circ}\text{C}$

- Using the axis for 10°C cooled medium we draw a vertical line to the heating power of 0.68 kW till it crosses the transverse line representing heater length of $L=1100$ mm.
- Draw a horizontal line and read the pressure loss value of **$\Delta p=0,98$ kPa**.





ELECTRIC CONNECTION (WIRING) DIAGRAM

Fan assisted trench heaters are regulated automatically by using a room controller and a thermal actuator. The controller, using the built-in sensor, measures the temperature in the room and maintains its value at the set value. High regulation precision is possible thanks to the simultaneous, fully automatic control of both the 2-position valve actuator and the fan motor.



VER-24S

- Room air temperature control
- Front panel made of glass
- Physical buttons
- Available in white colour
- Surface mounting



VER-24

- Room air temperature control
- Front panel made of glass
- Colourful, touch display
- Available on white or black colour
- Surface mounting



VER-24 WIFI

- Features the same as VER-24
- The built-in Wi-Fi module allows to control using a mobile device
- The ability to control from anywhere on Earth, thanks to the online application

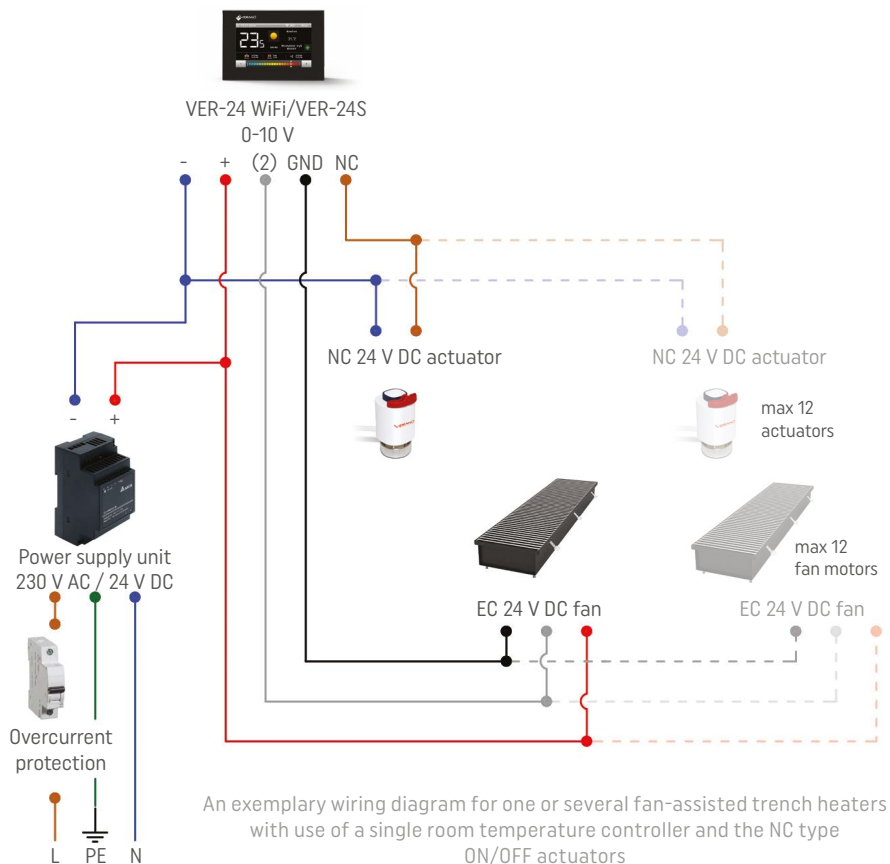
Common features of the regulators: built-in temperature sensor, control output of the 0-10 V DC actuator and ON / OFF actuator of the NC and NO type, the control output of the 0-10V DC EC fan. All regulators are supplied by 24 V DC.

The following are required for correct operation of trench heater with fan: room controller, thermal actuator installed on thermostatic valve and 24V DC power supply unit selected according to the electrical characteristics of installed heaters.

The room regulator, according to diagram below, is connected with heater fan and the actuator installed on thermostatic valve. The recommended wires type for control system is LIY or LIYCY. Due to the built-in temperature sensor the room controller should not be built over or covered with furniture or other interior design elements.

It is also possible to connect several fan-assisted heaters to a single regulator. In order to do that the heating zones should be correctly designated, so that the number of fan motors does not exceed 12 pieces, that is the upper limit for VER-24 WiFi and VER-24S controllers. The detailed electric data are presented in the respective sections of the product catalogue.

VERANO also offers 230 V AC/ 24 V DC DIN-rail or switchboard mounted power supply units. The example procedure for selection of power supply unit is presented on page 45. The power supply unit should be protected with appropriate overcurrent protection that will also allow to switch the power off during service and maintenance.



Only properly skilled and trained personnel, holding licenses and observing applicable standards can install electric connections. Power can only be switched back on when the correctness of the whole wiring was checked and approved.

Due to use of safe low-voltage fans the heaters can only be powered by 24 V DC voltage. It is prohibited to connect the heaters directly to 230 V AC power grid.



INSTALLATION AND MAINTENANCE MANUAL FOR VKN FAN ASSISTED HEATERS

Prior to start of assembly always make sure to prepare a trench in the floor with dimensions exceeding the dimensions of the heater by some 40-50mm in every direction. Plan the depth of the trench in such a way, that the surface of grille matches the expected floor finish level.

Levelling the trench casing of fan assisted trench heaters is achieved with use of levelling legs. The legs shall rest on the construction layer of the floor. The next step is to assemble the anchoring screws and anchors that fix the heater to the concrete.

Due to the strength requirements we recommend insulation materials with compression strength of no less than 70 kPa, e.g. the EPS70, for insulation of heater trench casing. Free spaces between insulation and trench casing should be filled with low compression foam. The casing of trench heater should only be installed after the heating set was first removed from it.

Fan assisted trench heater is installed in such a way that the heat exchanger faces the division and the fan faces the heated room. The fan assisted heaters are not universal – always remember to quote the correct connection side when ordering.

For the duration of finishing works it is recommended to cover the trench casing with assembly cover that protects the elements of the heater from mechanical damage and dust.

Prior to pouring concrete that the edge of the trench casing will rest on make sure that all water and control connections were installed.

Electric wires and installation pipes may be connected to the trench casing from its longer or shorter side. After hydraulic and electric connection of the heater, test the correctness of control system and remove all dirt from trench casing. The poured concrete that the edge of the trench casing will rest on should be at least 50 mm thick.

During assembly of trench heater always remember about the assembly spreaders that are included with the heater and prevent the trench casing and heater edge from deformation. Addition of dilatation mat on the side of heater trench casing allows to lower the contact surface of concrete and heater casing, which provides additional acoustic insulation of the heater.

The L and F type frames are additional accessories that allow the finishing of the trench casing edges during finishing works.

All assembly operations should be performed by properly skilled and trained construction industry, electrical and installation workers.

The trench heaters used in heating season should not be covered by carpets, furniture or curtains. The grilles can resist pressure and abrasion connected with low intensity pedestrian traffic. Avoid exercising excessive pressure on the grille bars, e.g. by placing room furnishings on them.

Due to the possible influence of dirt on the efficiency of heater we recommend the periodic cleaning of heater trench casing.

EXAMPLE OF CONNECTION VKN TRENCH HEATERS TO THE CENTRAL HEATING INSTALLATION



| Connection of the VKN trench heater



| Example: Straight connection

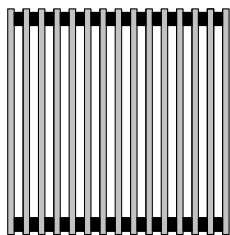


| Example: Angle connection



GRILLES FOR TRENCH HEATERS

Roll-up grille double T-bar profile



TOP VIEW



SINGLE BAR CROSS SECTION

STANDARD:

- Spacers 17 mm.
- Distance between the bars - 13 mm.
- Spacers made of black PVC.

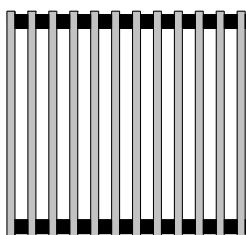
OPTION:

- Spacers are available in other colours and size:
- grey 13 mm, 8 mm.

Maximum length of one grille section is 6 m.

GRILLE TYPE	COLOUR	ORDER CODE
Roll-up grille, double T-bar profile - natural aluminium	Natural aluminium	ZDW-1,8/B/L
	Satin	ZADWS-1,8/B/L
Roll-up grille, double T-bar profile - anodized aluminium	Stainless steel	ZADWST-1,8/B/L
	Gold	ZADWZ-1,8/B/L
	Black	ZADWC-1,8/B/L

Roll-up grille closed profile



TOP VIEW



SINGLE BAR CROSS SECTION

STANDARD:

- Spacers 13 mm.
- Distance between the bars - 13 mm.
- Spacers made of black PVC.

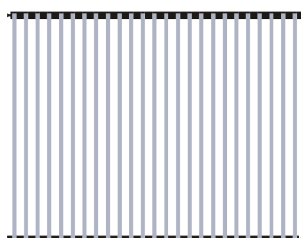
OPTION:

- Spacers are available in other colours and size:
- grey 17 mm, 8 mm.

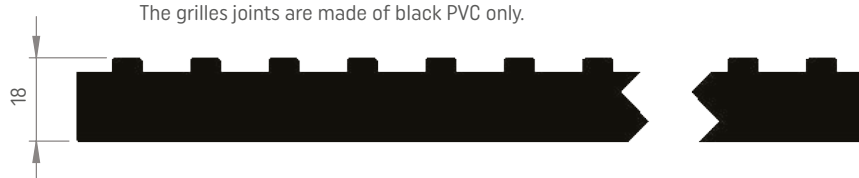
Maximum length of one grille section is 6 m.

GRILLE TYPE	COLOUR	ORDER CODE
Roll-up grille, closed profile - natural aluminium	Natural aluminium	ZAL-1,8/B/L
Roll-up grille, closed profile - anodized aluminium	Satin	ZAALS-1,8/B/L
	Stainless steel	ZAALST-1,8/B/L

Modular grille (made of aluminium)



TOP VIEW



CROSS SECTION

THE GRILLE IS AVAILABLE IN TWO VERSIONS:

- natural aluminium,
- anodized aluminium.

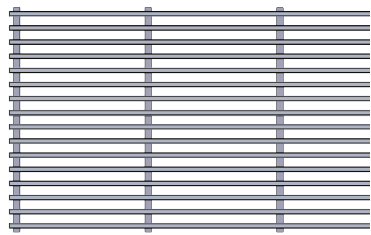
The grilles joints are made of black PVC only.

GRILLE TYPE	COLOUR	ORDER CODE
Modular grille - natural aluminium	Natural aluminium	MPZ-1,8/B/L
Modular grille - anodized aluminium	Satin	MPZAS-1,8/B/L
	Stainless steel	MPZAST-1,8/B/L



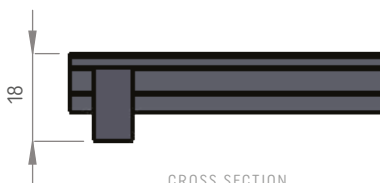
GRILLES FOR TRENCH HEATERS

Linear grille (made of aluminium)



TOP VIEW

GRILLE ENTIRELY MADE OF ALUMINIUM.



CROSS SECTION

The grille is available in the following variants:

- natural aluminium (cross – bar joiners are coated in black RAL 9005),
- aluminium coated in RAL colour (grille entirely coated in RAL),
- anodized aluminium (cross – bar joiners are coated in black RAL 9005).

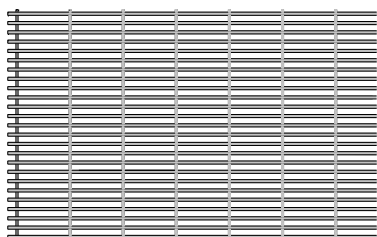
It is possible to make a corner grille for corner section of the heaters at an angle of 90° and others.

The corner grille can be made only if it is ordered with a heater at the same time.

Maximum length of one grille is 3 m.

GRILLE TYPE	COLOUR	ORDER CODE
Linear grille, snap profile - natural aluminium	Natural aluminium	PZW-1,8/B/L
Linear grille, snap profile - anodized aluminium	Satin	PZWAS-1,8/B/L
	Stainless steel	PZWAST-1,8/B/L
Linear grille, snap profile - RAL colour	RAL colour	PZWR-1,8/B/L

Stainless steel linear grille



TOP VIEW



CROSS SECTION

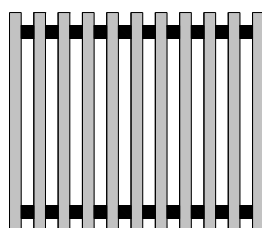
THE GRILLE IS AVAILABLE ONLY AS A RIGID VERSION.

Maximum length of one section of the grille is 2 m.

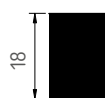
Grille length longer than 2 m are made of several elements of equal lengths.

GRILLE TYPE	COLOUR	ORDER CODE
Stainless steel linear grille	Stainless steel	SN-1,8/B/L
	Stainless steel brushed	SNS-1,8/B/L

Roll-up wooden grille (made of natural wood)



TOP VIEW



SINGLE BAR CROSS SECTION

STANDARD:

- Spacers 13 mm.
- Distance between the bars - 13 mm.
- Spacers made of black PVC.

OPTION:

Spacers are available in other colours and size:

- wooden spacers (beech) 17 mm,
- grey 17 mm, 8 mm.

Maximum length of one grille section is 6 m.

It is possible to make a corner grille for corner section of the heaters at an angle of 90° (heringbone grille). The corner grille can be made only if it is ordered with a heater at the same time.



OAK



ASH



BEECH

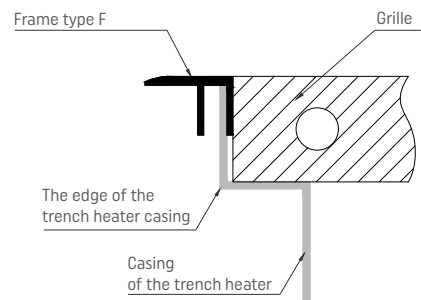
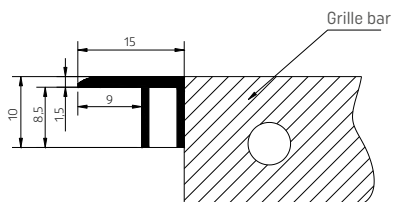
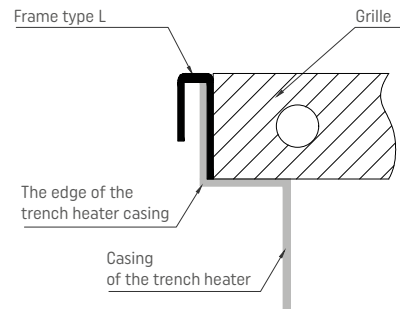
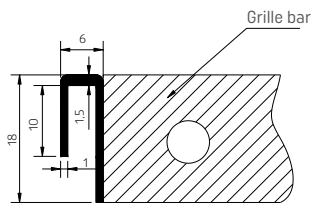
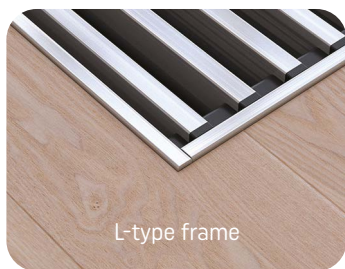


SAPELI

GRILLE TYPE	COLOUR	ORDER CODE
Roll-up wooden grille	Oak	ZD-1,8/B/L
	Ash	ZJ-1,8/B/L
	Beech	ZB-1,8/B/L
	Sapeli	ZS-1,8/B/L



FRAMES TYPE L AND F



COLOUR	F-TYPE FRAME	L-TYPE FRAME
Natural aluminium	OF-B/L	OL-B/L
Satin	OFS-B/L	OLS-B/L
Stainless steel	OFST-B/L	OLST-B/L
Gold	OFZ-B/L	OLZ-B/L
Black	OFC-B/L	OLC-B/L
RAL colour	OFRAL-B/L	OLRAL-B/L

ADDITIONAL EQUIPMENT FOR TRENCH HEATERS

ZPP Raised floor kit

Kit contains:

- 1 x support,
- 2 x expansion bolt with a screw,
- 4 x nut and washer.

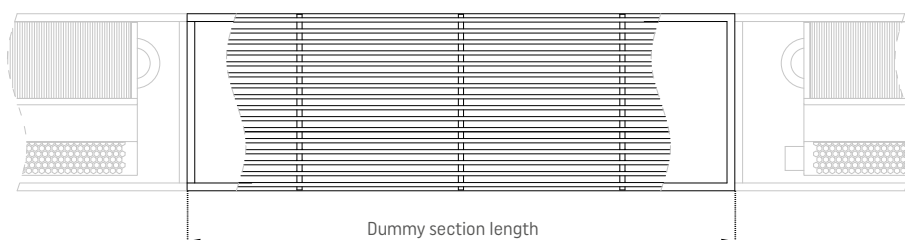
ZPP kit allow to level the unit up by 50 mm.
Other heights on request.



EXTENSION OR ADDITIONAL DUMMY SECTION OF THE TRENCH CASING

First step of heating units selection is choosing the standard unit with required heat output. Sometimes, standard lengths of units does not come together with architectural vision of the room. For this kind of situation we can offer customized solutions, such as:

- extension of the heater trench casing to the required length,
- making a separate dummy section of the trench casing equipped with all necessary assembly elements.



Separate dummy section is not compatible for heat exchanger or fan installation.
Maximum dummy section length is 4 m. Grilles and frames can be also customized.

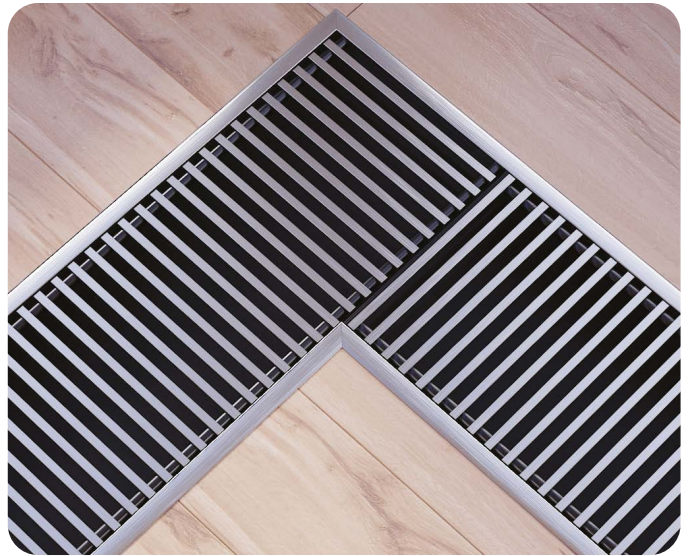


CORNER TRENCH AND GRILLE OPTIONS



CORNER TRENCH
• with linear grille.

FRAMES:
F-type



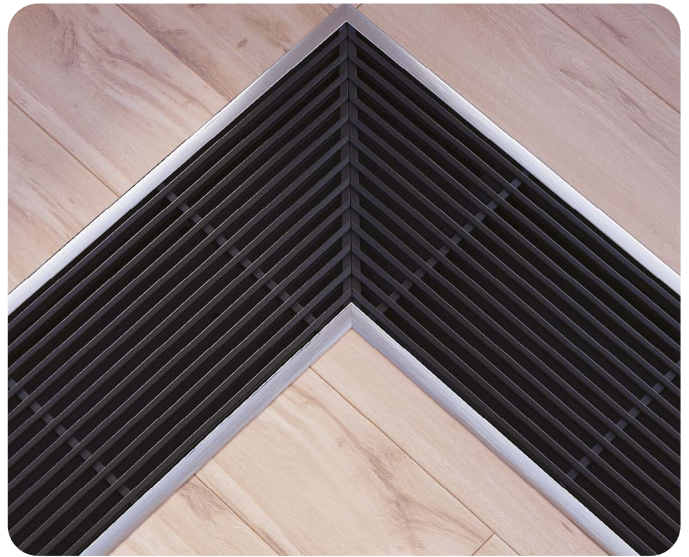
CORNER TRENCH
• with cross-bar grille.

FRAMES:
F-type



CORNER TRENCH
• with cross-bar grille
• herringbone grille shape.

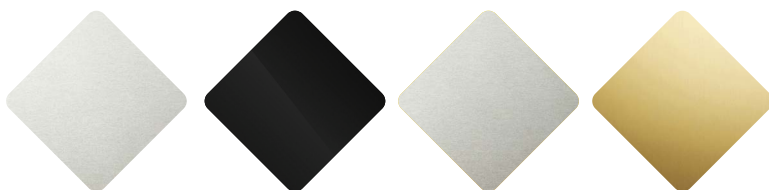
FRAMES:
F-type



CORNER TRENCH
• with linear grille
• herringbone grille shape

FRAMES:
F-type

ANODIZED ALUMINIUM COLOURS



SATIN

BLACK

STAINLESS STEEL

GOLD

F- and L-type frames are available in exact the same anodizing colours.

RAL PALETTE



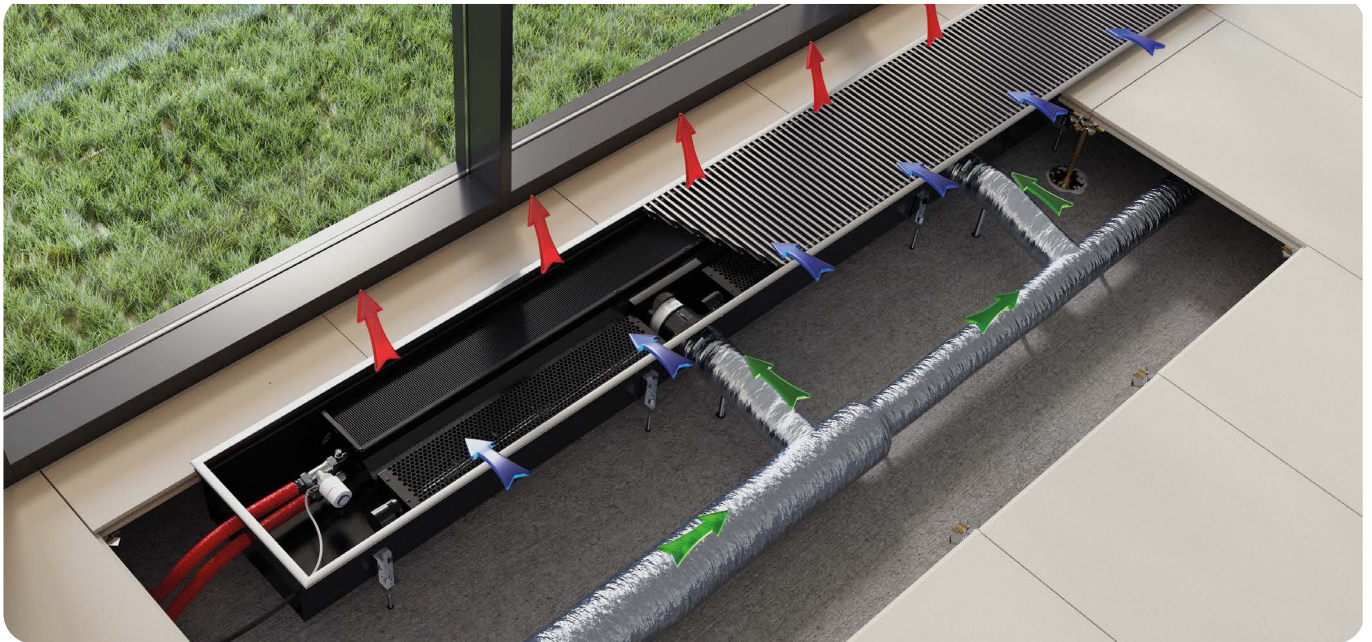
Frame and linear aluminium grilles are available in RAL colour at additional surcharge.



FAN ASSISTED TRENCH HEATERS WITH FRESH AIR SUPPLY

freshAIR+

The freshAIR+ VKN5P family of products are completely new trench heaters with the function of supplying conditioned air from the air handling unit.



More details in the freshAIR+ catalogue

The traditional heating system is based on recirculation air. In the construction of VKN5P trench heaters, which are part of the freshAIR+ system, it is possible to supply conditioned air from an AHU in which it undergoes initial filtration.

To optimize air flow regulation, VKN5P heaters have a factory-fitted constant air volume regulator (CAV), which allows quick and easy set-up of the designed air stream.

When designing a Demand Controlled Ventilation (DCV), it is possible to install an additional module with a variable air volume controller (VAV). Available BMS modules allow the use of a panel with an air quality meter (CO₂ measurement).

The airflow of conditioned air is supplied directly to the heat exchanger, thanks to which the supply air temperature can be locally adapted to the needs of users. The supply air temperature is regulated by an additional temperature sensor connected to the VER-44 WiFi controller or the BMS system.

ADVANTAGES OF VKN5P HEATERS USAGE:

- additional heating of air supplied from the air handling unit,
- quick setting of the projected air stream thanks built-in CAV regulator,
- the possibility of using one or two ventilation slots,
- a choice of three heights of the trench heaters: 120, 140 or 180 mm,
- the length of the heater is adjusted for the needs of interior design: from 1000 to 2550 mm,
- depending on the height of the trench heater there are three ventilation slots diameters available: 80, 100 and 125 mm.



VER-44 WiFi



AHUs, HEATERS, COOLERS, FAN ASSISTED TRENCH HEATERS AND CLIMACONVECTORS

freshAIR+

The family of freshAIR+ products also includes air handling units, air heaters and coolers, as well as trench heaters and climaconvectors, which will ensure comfort and clean air in your home.



freshAIR+ AIR HANDLING UNITS

Compact freshAIR+ air handling units are equipped with a two-stage filtration system, a heater or cooler and an enthalpy heat exchanger. The used Constant Flow system makes it easy to adjust installation and guarantees a constant air flow, regardless of weather conditions or the degree of contamination of the filters.



freshAIR+ DUCT HEATERS AND COOLERS

freshAIR+ heaters and coolers have a built-in control valve and actuator. The used screw connections allow for the separable connections, e.g. using a PEX connector. Coolers are also available with a built-in condensate pump.



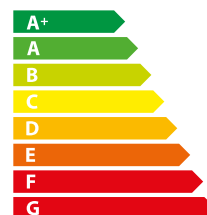
freshAIR+ TRENCH HEATERS AND CLIMACONVECTORS

freshAIR+ trench heaters and climaconvectors are equipped with modern heat exchangers to ensure thermal comfort in the room thanks to the possibility of local and central regulation. Built-in constant flow regulator and PICV valves allow you to simplify installation work. They are perfect especially in office spaces.



freshAIR+ AIR HANDLING UNITS ADVANTAGES:

- Modern casing made of EPP,
- Recovery of temperature and moisture from the removed air,
- Automatic bypass,
- The ePM10 and ePM1.0 anti-smog filters compliant with the new standard,
- Control with PM2.5 and CO2 sensors,
- A constant stream of air regardless of weather conditions and the degree of filter contamination,
- Built-in PTC pre-heater,
- Built-in reheater or water cooler,
- Energy-saving EC fans,
- Aesthetic frame masking the condensate drain,
- Wireless control via a mobile application (Android and iOS) and a website,
- High thermal and acoustic insulation,
- Light construction,
- High energy efficiency.



VERANO

G L O B A L



VK
NATURAL CONVECTION
TRENCH HEATERS

VK
Natural convection trench heaters



VKN
FAN ASSISTED
TRENCH HEATERS

VKN
Fan assisted trench heaters




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TRENCH HEATING AND COOLING UNITS

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Heating and cooling trench units



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FRESH AIR SUPPLY
SYSTEM

FRESHAIR+
Fresh air supply system

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