



# VKN SILENT

FAN ASSISTED TRENCH HEATERS



# VKN SILENT trench heaters

are an ideal solution for rooms where user comfort and reduced noise from the device are most important. They are perfect for bedrooms, offices or conference rooms.





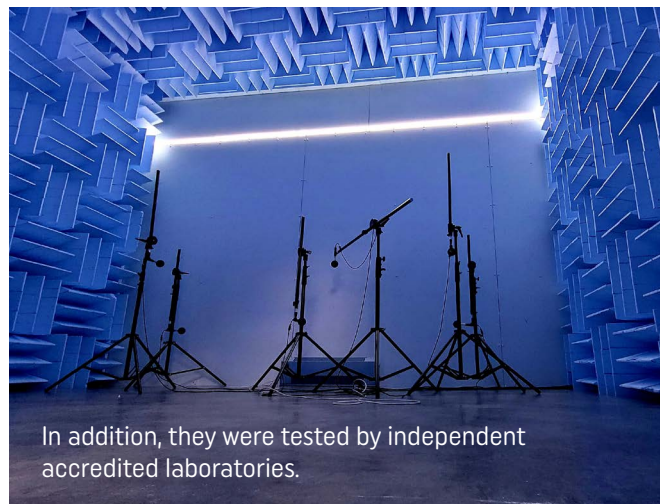
## High power with less noise

Our devices are distinguished by their exceptional efficiency and quiet operation, which ensures comfort of use even in the most demanding conditions.

VKN SILENT series heaters are an excellent choice for everyone who values comfort, efficiency and elegant design. Installing VKN SILENT heaters in offices or conference rooms ensures optimal working conditions and creates a comfortable environment conducive to concentration and creativity.

The fans with EC motors used in our heaters are characterized by high energy efficiency. Currently, this is an important factor when choosing this type of device by Investors.

VKN SILENT heaters were created based on the results of research and development work conducted in our laboratories.



In addition, they were tested by independent accredited laboratories.



The noise level was tested by the Laboratory of the Institute of Energy, State Research Institute, Department of Thermal Technology „ITC” in Łódź, and the heating power levels were confirmed by tests in the HEATEST s.r.o. laboratory in the Czech Republic (research laboratory no. L1477 accredited by CAI).

**HEATEST, s.r.o.**  
 HEATEST s.r.o. 0.p. 84, 276 01 Břevčice, Czech Republic  
 zkoušební laborator č. L1477 akreditovaná CAI podle ČSN EN ISO/IEC 17025:2018  
 Testing laboratory No. L1477 accredited by CAI in accordance with ČSN EN ISO/IEC 17025:2018  
 Schválené zkoušební místo dle ČSN EN 442-2: 2015, 5.2.4.2.2  
 Approved test installation according to ČSN EN 442-2: 2015, 5.2.4.2.2

Telefon: +420 805 247 353 Počet stran textu: 6  
 E-mail: info@heatest.cz Počet příloh/počet stran: 4/5  
 Web: www.heatest.cz Number of enclosures/number of pages:

**PROTOKOL O ZKOUŠCE Č. I TEST REPORT No. 029/2024**  
 ze dne: 23. 05. 2024

Objednatel / Customer: VERANO GLOBAL Sp. z o.o.  
 Vetterów 7a street, 20-277 Lublin, Poland

Výrobce: VERANO GLOBAL Sp. z o.o.  
 Manufacturer: Vetterów 7a street, 20-277 Lublin, Poland

Zakázka číslo / Order No.: 012/24 (service specification 013/2024)

Předmět zkoušky: Zkouška teplotního výkonu podlahového konvektoru samostatného  
 Subject of the test: Test of the Thermal output – natural convection trench convectors of type VKN2 in acc. with ČSN EN 16430-2

Zkoušební vzorek (vzorůky): VERANO VKN2-0925/140 SILENT 044-2024  
 Test sample (samples):

Místo provedení zkoušek: Stálé prostory laboratorů / Laboratory's permanent facilities  
 Place of testing:

Datum převzetí vzorků: 30. 04. 2024  
 Date of the sample takeover

Datum vykonání zkoušek: 09. – 13. 05. 2024  
 Date of the test

Zkoušku provedl / Test engineer: Pavel Poichro  
 Přezkoumal a schválil: Ing. Tomáš Langáš vedoucí laboratorů / head of testing laboratory  
 Reviewed and authorized by:

0 6 - 96 - 005  
 Výisk č.: 1

**INSTYTUT ENERGETYKI PAŃSTWOWY INSTYTUT BADAWCZY**  
**ODDZIAŁ TECHNIKI CIEPLNEJ „ITC” w Łodzi**  
 93-208 Łódź, ul. Dąbrowskiego 113  
 www.itc.edu.pl, e-mail: itc@itc.edu.pl

Temat w ITC: 04240030  
 Nr ewidencyjny: 8787

### Tytuł pracy Badanie elementów grzewczych produkcji Verano

Autorzy:  
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Dyrektor Oddziału:  
 dr inż. Jacek Karcewski

Udostępnienie obiektu do badań  
 kwiecień 2024 r.

Rozpoczęcie pracy  
 maj 2024 r.

Zakończenie pracy  
 czerwiec 2024 r.

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Data wydania  
 11.06.2024 r.

Rozdručník  
 1. ITC „ITC”, CITE  
 2. Verano Global Sp. z o.o.

1 egz.  
 2 egz.



## VKN SILENT height 90 mm



### EQUIPMENT

#### STANDARD EQUIPMENT:

- Casing made of galvanised steel sheet in RAL 9005 black,
- highly efficient copper-aluminium heat exchanger with air vent,
- modern fan with silent end efficient 24 V DC motor,
- connection space cover,
- water connection: 3/4" female thread,
- assembly struts,
- fastening anchors,
- trench positioning adjustment system.

#### ADDITIONAL EQUIPMENT:

- Casing powder coated in RAL colour,
- decorative frame (F or L type) made of natural or anodized aluminium or painted in RAL colour
- 18mm high decorative grille:
  - roll-up: made of wood, natural or anodized aluminium
  - linear: made of natural, anodized aluminium or stainless steel or painted in RAL
- assembly fibreboard protection for installing and transporting
- raised floor kit,
- 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)	90
Trench bottom width (B)	250
Top width/Grille width (Bk)	284
Trench length (Lk)	900-2500

#### EXAMPLE ORDER CODE:

**VKN2-09/25/125 (L) SILENT**

Trench length Lk [cm]

Connection side  
(L - Left/P - Right)



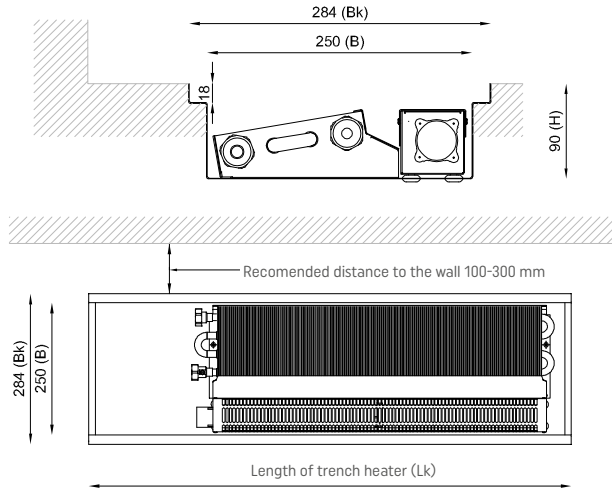
## HEIGHT 90 mm

## VKN2-09/25/Lk SILENT



ORDER CODE

DIMENSIONS	UNIT [mm]
Trench height (H)	90
Trench bottom width (B)	250
Trench top width (Bk)	284
Trench length (Lk)	900-2500
CONNECTIONS	TYPE
Connection threads	¾" female thread,
Connection side	Left (L) standard, Right (R) option
ACCESSORIES	TYPE
Grille H=18 mm	Roll-up / linear / modular
Frame	L or F



Model	VKN2-09/25/090 SILENT					VKN2-09/25/100 SILENT					VKN2-09/25/125 SILENT					VKN2-09/25/140 SILENT					VKN2-09/25/165 SILENT									
Heat output $\Phi$ [W] dla $t_p/t_r/t_a$																														
Operating voltage [V]	2	4	6	8	10	2	4	6	8	10	2	4	6	8	10	2	4	6	8	10	2	4	6	8	10	2	4	6	8	10
75/65/20°C	626	778	945	1104	1234	732	998	1208	1387	1559	960	1282	1596	1873	2083	1103	1715	2130	2400	2576	1158	1801	2237	2520	2705					
55/45/20°C	312	389	472	551	616	343	468	567	651	731	511	683	850	998	1110	640	995	1236	1392	1495	672	1045	1298	1462	1569					
35/30/20°C	95	118	143	168	187	94	128	155	178	200	174	232	289	339	377	251	391	486	548	588	264	411	510	575	617					
Sound power level Lw [dB(A)]	24	26	28	30	32	24	26	29	31	33	26	29	30	34	37	27	29	30	34	39	27	30	33	37	41					
Sound pressure level Lp [dB(A)]	16	18	20	22	24	16	18	21	23	25	18	21	22	26	29	19	21	22	26	31	19	22	25	29	33					
Air flow V [m³/h]	49	63	82	100	116	61	83	105	127	149	72	103	136	167	194	77	142	188	221	243	86	153	201	236	260					
SFP value [Ws/m³]	17	27	31	34	37	14	20	24	27	29	12	16	19	25	31	11	12	18	31	42	10	16	21	32	43					
Current I [A]	0,01	0,02	0,03	0,04	0,05	0,01	0,02	0,03	0,04	0,05	0,01	0,02	0,03	0,05	0,07	0,01	0,02	0,04	0,08	0,12	0,01	0,03	0,05	0,09	0,13					
Electric power demand P [W]	0,24	0,48	0,72	0,96	1,20	0,24	0,48	0,72	0,96	1,20	0,24	0,48	0,72	1,20	1,68	0,24	0,48	0,96	1,92	2,88	0,24	0,72	1,20	2,16	3,12					
Max starting current I <sub>max</sub> [A]	0,24					0,26					0,23					0,27					0,27									
Number of fan motors	1					1					1					1					1									

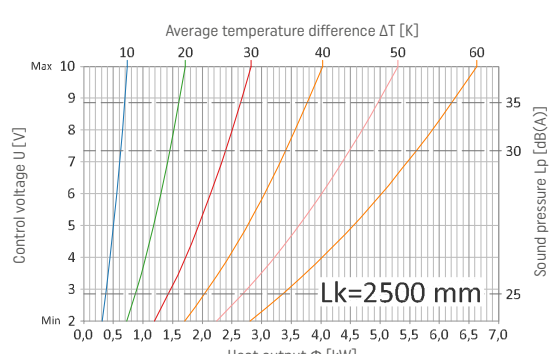
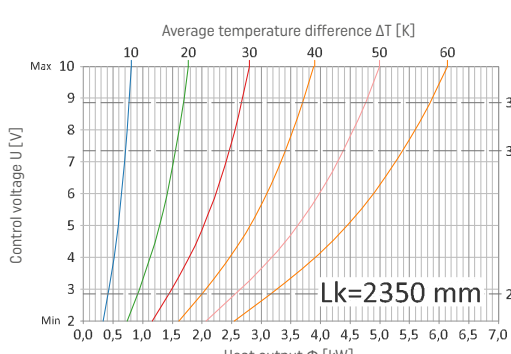
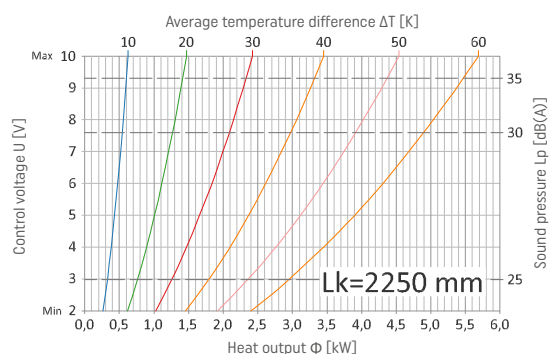
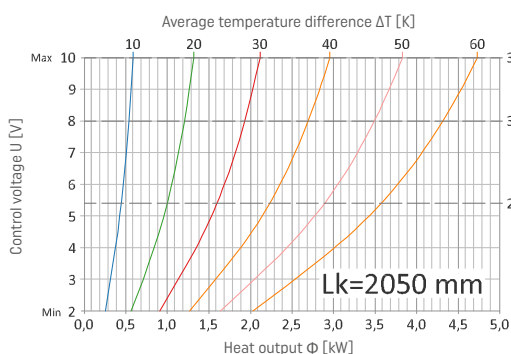
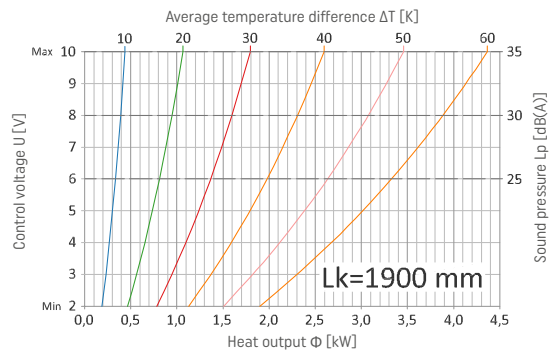
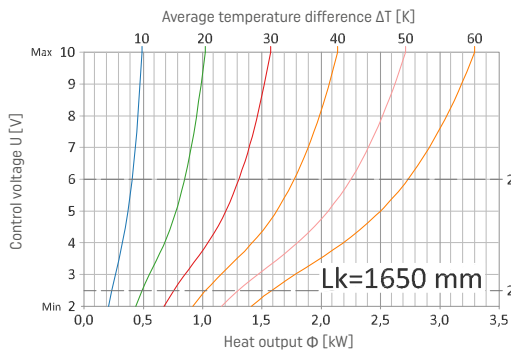
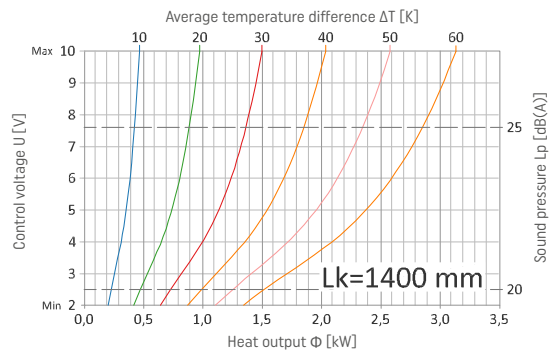
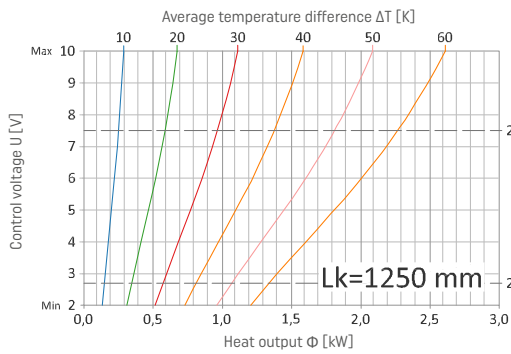
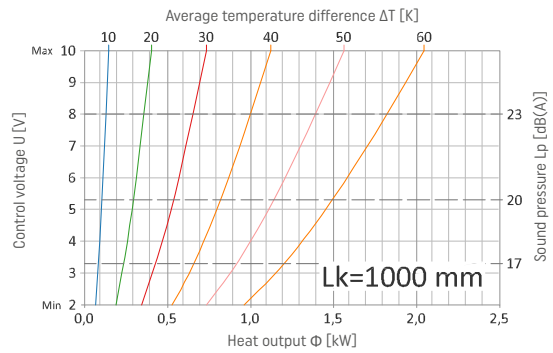
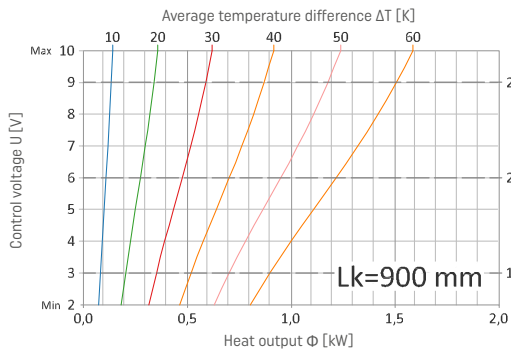
Model	VKN2-09/25/190 SILENT					VKN2-09/25/205 SILENT					VKN2-09/25/225 SILENT					VKN2-09/25/235 SILENT					VKN2-09/25/250 SILENT									
Moc cieplna $\Phi$ [W] dla $t_p/t_r/t_a$																														
Operating voltage [V]	2	4	6	8	10	2	4	6	8	10	2	4	6	8	10	2	4	6	8	10	2	4	6	8	10	2	4	6	8	10
75/65/20°C	1501	2111	2626	3066	3448	1641	2443	3050	3498	3830	1916	2752	3437	4016	4534	2063	3177	3973	4545	4987	2209	3669	4551	5050	5358					
55/45/20°C	842	1184	1473	1719	1934	906	1349	1684	1932	2115	1021	1467	1832	2141	2417	1157	1781	2227	2548	2796	1290	2143	2658	2949	3129					
35/30/20°C	312	439	546	638	718	327	487	608	698	764	347	499	623	728	822	429	660	826	945	1037	513	852	1057	1173	1245					
Sound power level Lw [dB(A)]	29	30	33	38	43	29	31	34	38	43	30	34	35	39	44	30	34	35	40	45	30	32	35	41	46					
Sound pressure level Lp [dB(A)]	21	22	25	30	35	21	23	26	30	35	22	26	27	31	36	22	26	27	32	37	22	24	27	33	38					
Air flow V [m³/h]	107	163	215	263	308	116	190	253	303	342	137	215	286	351	413	147	252	337	403	456	157	297	393	452	490					
SFP value [Ws/m³]	16	21	28	39	50	14	18	27	34	47	12	20	24	32	39	11	17	23	34	47	10	17	26	40	58					
Current I [A]	0,02	0,04	0,07	0,12	0,18	0,02	0,04	0,08	0,12	0,19	0,02	0,05	0,08	0,13	0,19	0,02	0,05	0,09	0,16	0,25	0,02	0,06	0,12	0,21	0,33					
Electric power demand P [W]	0,48	0,96	1,68	2,88	4,32	0,48	0,96	1,92	2,88	4,56	0,48	1,20	1,92	3,12	4,56	0,48	1,20	2,16	3,84	6,00	0,48	1,44	2,88	5,04	7,92					
Max starting current I <sub>max</sub> [A]	0,47					0,51					0,46					0,50					0,54									
Number of fan motors	2					2					2					2					2									

- Standard heating output [W] compliant to EN-16430, room air temperature  $\theta_i = 20^\circ\text{C}$ .
- Sound power measurement is performed in accordance with the PN-EN ISO 3744 or PN-EN ISO 3741 standard.
- Sound pressure levels are given assuming a room attenuation of 8 dB(A).



## HEAT OUTPUT AND SOUND PRESSURE OF VKN2-09/25/LK SILENT

The graphs present how heat output  $\Phi$  [W] depends on the respective average temperature differences  $\Delta T$  [K] for control voltages  $U$  [V]. The graphs also present the sound pressure levels for the respective heater operating conditions.







## CORRECTIVE FACTORS FOR VKN2-09/25/LK SILENT HEATERS

Heat output corrective factors for VKN2-9/25/Lk SILENT heaters for installation temperatures other than 75/65/20°C.

SUPPLY AND RETURN TEMPERATURES [°C]		VKN2-09/25/090 SILENT							VKN2-09/25/100 SILENT						
		ROOM AIR TEMPERATURE $\theta_i$ [°C]							ROOM AIR TEMPERATURE $\theta_i$ [°C]						
$t_s$	$t_r$	5	8	12	16	20	24	32	5	8	12	16	20	24	32
90	85	1,975	1,878	1,751	1,626	1,504	1,384	1,153	2,100	1,988	1,842	1,699	1,560	1,425	1,168
	80	1,894	1,798	1,672	1,549	1,429	1,310	1,083	2,006	1,896	1,752	1,612	1,475	1,343	1,091
	75	1,814	1,719	1,595	1,473	1,354	1,238	1,014	1,914	1,806	1,664	1,526	1,392	1,262	1,015
	70	1,735	1,641	1,519	1,399	1,281	1,167	0,946	1,824	1,717	1,577	1,442	1,310	1,183	0,942
85	80	1,814	1,719	1,595	1,473	1,354	1,238	1,014	1,914	1,806	1,664	1,526	1,392	1,262	1,015
	75	1,735	1,641	1,519	1,399	1,281	1,167	0,946	1,824	1,717	1,577	1,442	1,310	1,183	0,942
	70	1,657	1,565	1,443	1,325	1,209	1,097	0,880	1,734	1,629	1,492	1,359	1,230	1,106	0,870
	65	1,580	1,489	1,369	1,252	1,138	1,027	0,815	1,646	1,543	1,409	1,278	1,152	1,030	0,800
80	75	1,657	1,565	1,443	1,325	1,209	1,097	0,880	1,734	1,629	1,492	1,359	1,230	1,106	0,870
	70	1,580	1,489	1,369	1,252	1,138	1,027	0,815	1,646	1,543	1,409	1,278	1,152	1,030	0,800
	65	1,504	1,414	1,296	1,181	1,069	0,960	0,751	1,560	1,459	1,327	1,199	1,075	0,956	0,732
	60	1,429	1,340	1,224	1,110	1,000	0,893	0,689	1,475	1,376	1,246	1,121	1,000	0,884	0,666
75	70	1,504	1,414	1,296	1,181	1,069	0,960	0,751	1,560	1,459	1,327	1,199	1,075	0,956	0,732
	65	1,429	1,340	1,224	1,110	1,000	0,893	0,689	1,475	1,376	1,246	1,121	1,000	0,884	0,666
	60	1,354	1,267	1,153	1,041	0,933	0,828	0,628	1,392	1,294	1,168	1,045	0,927	0,814	0,602
	55	1,281	1,195	1,083	0,973	0,867	0,764	0,569	1,310	1,215	1,091	0,971	0,856	0,746	0,541
70	65	1,354	1,267	1,153	1,041	0,933	0,828	0,628	1,392	1,294	1,168	1,045	0,927	0,814	0,602
	60	1,281	1,195	1,083	0,973	0,867	0,764	0,569	1,310	1,215	1,091	0,971	0,856	0,746	0,541
	55	1,209	1,124	1,014	0,906	0,802	0,701	0,511	1,230	1,137	1,015	0,898	0,786	0,679	0,481
	50	1,138	1,055	0,946	0,841	0,739	0,640	0,455	1,152	1,060	0,942	0,828	0,719	0,615	0,424
65	60	1,209	1,124	1,014	0,906	0,802	0,701	0,511	1,230	1,137	1,015	0,898	0,786	0,679	0,481
	55	1,138	1,055	0,946	0,841	0,739	0,640	0,455	1,152	1,060	0,942	0,828	0,719	0,615	0,424
	50	1,069	0,987	0,880	0,777	0,677	0,581	0,401	1,075	0,986	0,870	0,759	0,653	0,553	0,369
	45	1,000	0,920	0,815	0,714	0,616	0,522	0,348	1,000	0,913	0,800	0,692	0,590	0,493	0,317
60	55	1,069	0,987	0,880	0,777	0,677	0,581	0,401	1,075	0,986	0,870	0,759	0,653	0,553	0,369
	50	1,000	0,920	0,815	0,714	0,616	0,522	0,348	1,000	0,913	0,800	0,692	0,590	0,493	0,317
	45	0,933	0,854	0,751	0,652	0,557	0,466	0,298	0,927	0,842	0,732	0,628	0,529	0,435	0,267
	40	0,867	0,789	0,689	0,592	0,500	0,411	0,250	0,856	0,773	0,666	0,565	0,470	0,380	0,220
55	50	0,933	0,854	0,751	0,652	0,557	0,466	0,298	0,927	0,842	0,732	0,628	0,529	0,435	0,267
	45	0,867	0,789	0,689	0,592	0,500	0,411	0,250	0,856	0,773	0,666	0,565	0,470	0,380	0,220
	40	0,802	0,726	0,628	0,534	0,444	0,359	0,204	0,786	0,706	0,602	0,505	0,413	0,327	0,177
	35	0,739	0,664	0,569	0,477	0,390	0,308	0,160	0,719	0,641	0,541	0,447	0,358	0,277	0,136
50	45	0,802	0,726	0,628	0,534	0,444	0,359	0,204	0,786	0,706	0,602	0,505	0,413	0,327	0,177
	40	0,739	0,664	0,569	0,477	0,390	0,308	0,160	0,719	0,641	0,541	0,447	0,358	0,277	0,136
	35	0,677	0,604	0,511	0,422	0,338	0,259	0,120	0,653	0,577	0,481	0,391	0,307	0,229	0,099
45	40	0,677	0,604	0,511	0,422	0,338	0,259	0,120	0,653	0,577	0,481	0,391	0,307	0,229	0,099
	35	0,616	0,545	0,455	0,369	0,288	0,213	0,083	0,590	0,517	0,424	0,337	0,258	0,185	0,066
40	35	0,557	0,488	0,401	0,318	0,240	0,169	0,050	0,529	0,458	0,369	0,287	0,211	0,144	0,038
	30	0,500	0,433	0,348	0,269	0,195	0,128	0,022	0,470	0,402	0,317	0,239	0,168	0,106	0,016
35	30	0,444	0,380	0,298	0,222	0,152	0,090	0,002	0,413	0,348	0,267	0,194	0,128	0,073	0,001



## CORRECTIVE FACTORS FOR VKN2-09/25/LK SILENT HEATERS

SUPPLY AND RETURN TEMPERATURES [°C]		VKN2-09/25/125 SILENT							VKN2-09/25/140 SILENT						
		ROOM AIR TEMPERATURE $\theta_1$ [°C]							ROOM AIR TEMPERATURE $\theta_1$ [°C]						
$t_s$	$t_r$	5	8	12	16	20	24	32	5	8	12	16	20	24	32
90	85	1,854	1,771	1,662	1,554	1,448	1,343	1,137	1,705	1,639	1,551	1,464	1,377	1,290	1,118
	80	1,785	1,703	1,594	1,487	1,382	1,278	1,075	1,650	1,584	1,497	1,410	1,323	1,236	1,064
	75	1,716	1,635	1,527	1,421	1,317	1,214	1,013	1,595	1,530	1,442	1,355	1,269	1,182	1,011
	70	1,648	1,567	1,461	1,356	1,252	1,150	0,951	1,541	1,475	1,388	1,301	1,215	1,129	0,958
85	80	1,716	1,635	1,527	1,421	1,317	1,214	1,013	1,595	1,530	1,442	1,355	1,269	1,182	1,011
	75	1,648	1,567	1,461	1,356	1,252	1,150	0,951	1,541	1,475	1,388	1,301	1,215	1,129	0,958
	70	1,581	1,501	1,395	1,291	1,188	1,087	0,890	1,486	1,420	1,334	1,247	1,161	1,075	0,905
	65	1,514	1,434	1,330	1,226	1,125	1,025	0,831	1,431	1,366	1,279	1,193	1,107	1,021	0,852
80	75	1,581	1,501	1,395	1,291	1,188	1,087	0,890	1,486	1,420	1,334	1,247	1,161	1,075	0,905
	70	1,514	1,434	1,330	1,226	1,125	1,025	0,831	1,431	1,366	1,279	1,193	1,107	1,021	0,852
	65	1,448	1,369	1,265	1,163	1,062	0,963	0,771	1,377	1,312	1,225	1,139	1,054	0,968	0,799
	60	1,382	1,304	1,201	1,100	1,000	0,903	0,713	1,323	1,258	1,171	1,086	1,000	0,915	0,747
75	70	1,448	1,369	1,265	1,163	1,062	0,963	0,771	1,377	1,312	1,225	1,139	1,054	0,968	0,799
	65	1,382	1,304	1,201	1,100	1,000	0,903	0,713	1,323	1,258	1,171	1,086	1,000	0,915	0,747
	60	1,317	1,239	1,137	1,037	0,939	0,842	0,656	1,269	1,204	1,118	1,032	0,947	0,862	0,694
	55	1,252	1,175	1,075	0,976	0,878	0,783	0,599	1,215	1,150	1,064	0,979	0,894	0,810	0,642
70	65	1,317	1,239	1,137	1,037	0,939	0,842	0,656	1,269	1,204	1,118	1,032	0,947	0,862	0,694
	60	1,252	1,175	1,075	0,976	0,878	0,783	0,599	1,215	1,150	1,064	0,979	0,894	0,810	0,642
	55	1,188	1,112	1,013	0,915	0,819	0,725	0,544	1,161	1,096	1,011	0,926	0,841	0,757	0,591
	50	1,125	1,050	0,951	0,854	0,760	0,667	0,490	1,107	1,043	0,958	0,873	0,789	0,705	0,539
65	60	1,188	1,112	1,013	0,915	0,819	0,725	0,544	1,161	1,096	1,011	0,926	0,841	0,757	0,591
	55	1,125	1,050	0,951	0,854	0,760	0,667	0,490	1,107	1,043	0,958	0,873	0,789	0,705	0,539
	50	1,062	0,988	0,890	0,795	0,702	0,611	0,436	1,054	0,989	0,905	0,820	0,736	0,653	0,488
	45	1,000	0,927	0,831	0,736	0,645	0,555	0,384	1,000	0,936	0,852	0,768	0,684	0,601	0,437
60	55	1,062	0,988	0,890	0,795	0,702	0,611	0,436	1,054	0,989	0,905	0,820	0,736	0,653	0,488
	50	1,000	0,927	0,831	0,736	0,645	0,555	0,384	1,000	0,936	0,852	0,768	0,684	0,601	0,437
	45	0,939	0,866	0,771	0,679	0,588	0,500	0,333	0,947	0,883	0,799	0,715	0,632	0,550	0,387
	40	0,878	0,807	0,713	0,622	0,533	0,447	0,284	0,894	0,831	0,747	0,663	0,580	0,498	0,337
55	50	0,939	0,866	0,771	0,679	0,588	0,500	0,333	0,947	0,883	0,799	0,715	0,632	0,550	0,387
	45	0,878	0,807	0,713	0,622	0,533	0,447	0,284	0,894	0,831	0,747	0,663	0,580	0,498	0,337
	40	0,819	0,748	0,656	0,566	0,479	0,395	0,236	0,841	0,778	0,694	0,611	0,529	0,447	0,287
	35	0,760	0,690	0,599	0,511	0,426	0,343	0,190	0,789	0,726	0,642	0,560	0,478	0,397	0,238
50	45	0,819	0,748	0,656	0,566	0,479	0,395	0,236	0,841	0,778	0,694	0,611	0,529	0,447	0,287
	40	0,760	0,690	0,599	0,511	0,426	0,343	0,190	0,789	0,726	0,642	0,560	0,478	0,397	0,238
	35	0,702	0,633	0,544	0,457	0,374	0,294	0,146	0,736	0,674	0,591	0,509	0,427	0,347	0,190
	30	0,645	0,577	0,490	0,405	0,323	0,246	0,105	0,684	0,622	0,539	0,458	0,377	0,297	0,142
45	40	0,702	0,633	0,544	0,457	0,374	0,294	0,146	0,736	0,674	0,591	0,509	0,427	0,347	0,190
	35	0,645	0,577	0,490	0,405	0,323	0,246	0,105	0,684	0,622	0,539	0,458	0,377	0,297	0,142
40	35	0,588	0,522	0,436	0,354	0,274	0,199	0,066	0,632	0,570	0,488	0,407	0,327	0,248	0,095
	30	0,533	0,468	0,384	0,304	0,227	0,155	0,031	0,580	0,519	0,437	0,357	0,277	0,199	0,050
35	30	0,479	0,415	0,333	0,255	0,181	0,113	0,003	0,529	0,468	0,387	0,307	0,228	0,151	0,007





## CORRECTIVE FACTORS FOR VKN2-09/25/LK SILENT HEATERS

SUPPLY AND RETURN TEMPERATURES [°C]		VKN2-09/25/165 SILENT							VKN2-09/25/190 SILENT						
		ROOM AIR TEMPERATURE $\theta_1$ [°C]							ROOM AIR TEMPERATURE $\theta_1$ [°C]						
$t_s$	$t_r$	5	8	12	16	20	24	32	5	8	12	16	20	24	32
90	85	1,705	1,639	1,551	1,464	1,377	1,290	1,118	1,902	1,814	1,698	1,583	1,470	1,359	1,144
	80	1,650	1,584	1,497	1,409	1,323	1,236	1,064	1,829	1,741	1,626	1,512	1,401	1,291	1,078
	75	1,595	1,530	1,442	1,355	1,268	1,182	1,011	1,756	1,669	1,555	1,442	1,332	1,224	1,013
	70	1,540	1,475	1,388	1,301	1,214	1,128	0,958	1,683	1,597	1,484	1,373	1,264	1,157	0,949
85	80	1,595	1,530	1,442	1,355	1,268	1,182	1,011	1,756	1,669	1,555	1,442	1,332	1,224	1,013
	75	1,540	1,475	1,388	1,301	1,214	1,128	0,958	1,683	1,597	1,484	1,373	1,264	1,157	0,949
	70	1,486	1,420	1,333	1,247	1,161	1,075	0,904	1,612	1,526	1,415	1,305	1,197	1,091	0,886
	65	1,431	1,366	1,279	1,193	1,107	1,021	0,852	1,541	1,456	1,346	1,237	1,130	1,026	0,824
80	75	1,486	1,420	1,333	1,247	1,161	1,075	0,904	1,612	1,526	1,415	1,305	1,197	1,091	0,886
	70	1,431	1,366	1,279	1,193	1,107	1,021	0,852	1,541	1,456	1,346	1,237	1,130	1,026	0,824
	65	1,377	1,312	1,225	1,139	1,053	0,968	0,799	1,470	1,387	1,278	1,170	1,065	0,962	0,763
	60	1,323	1,258	1,171	1,086	1,000	0,915	0,747	1,401	1,318	1,210	1,104	1,000	0,899	0,703
75	70	1,377	1,312	1,225	1,139	1,053	0,968	0,799	1,470	1,387	1,278	1,170	1,065	0,962	0,763
	65	1,323	1,258	1,171	1,086	1,000	0,915	0,747	1,401	1,318	1,210	1,104	1,000	0,899	0,703
	60	1,268	1,204	1,118	1,032	0,947	0,862	0,694	1,332	1,250	1,144	1,039	0,936	0,837	0,644
	55	1,214	1,150	1,064	0,979	0,894	0,809	0,642	1,264	1,183	1,078	0,975	0,874	0,775	0,587
70	65	1,268	1,204	1,118	1,032	0,947	0,862	0,694	1,332	1,250	1,144	1,039	0,936	0,837	0,644
	60	1,214	1,150	1,064	0,979	0,894	0,809	0,642	1,264	1,183	1,078	0,975	0,874	0,775	0,587
	55	1,161	1,096	1,011	0,926	0,841	0,757	0,591	1,197	1,117	1,013	0,911	0,812	0,715	0,530
	50	1,107	1,043	0,958	0,873	0,788	0,705	0,539	1,130	1,052	0,949	0,849	0,751	0,656	0,475
65	60	1,161	1,096	1,011	0,926	0,841	0,757	0,591	1,197	1,117	1,013	0,911	0,812	0,715	0,530
	55	1,107	1,043	0,958	0,873	0,788	0,705	0,539	1,130	1,052	0,949	0,849	0,751	0,656	0,475
	50	1,053	0,989	0,904	0,820	0,736	0,653	0,488	1,065	0,987	0,886	0,787	0,691	0,598	0,421
	45	1,000	0,936	0,852	0,767	0,684	0,601	0,437	1,000	0,924	0,824	0,727	0,633	0,542	0,369
60	55	1,053	0,989	0,904	0,820	0,736	0,653	0,488	1,065	0,987	0,886	0,787	0,691	0,598	0,421
	50	1,000	0,936	0,852	0,767	0,684	0,601	0,437	1,000	0,924	0,824	0,727	0,633	0,542	0,369
	45	0,947	0,883	0,799	0,715	0,632	0,549	0,387	0,936	0,861	0,763	0,668	0,575	0,486	0,318
	40	0,894	0,831	0,747	0,663	0,580	0,498	0,337	0,874	0,800	0,703	0,610	0,519	0,432	0,270
55	50	0,947	0,883	0,799	0,715	0,632	0,549	0,387	0,936	0,861	0,763	0,668	0,575	0,486	0,318
	45	0,894	0,831	0,747	0,663	0,580	0,498	0,337	0,874	0,800	0,703	0,610	0,519	0,432	0,270
	40	0,841	0,778	0,694	0,611	0,529	0,447	0,287	0,812	0,739	0,644	0,553	0,464	0,379	0,222
	35	0,788	0,726	0,642	0,560	0,478	0,397	0,238	0,751	0,680	0,587	0,497	0,411	0,328	0,177
50	45	0,841	0,778	0,694	0,611	0,529	0,447	0,287	0,812	0,739	0,644	0,553	0,464	0,379	0,222
	40	0,788	0,726	0,642	0,560	0,478	0,397	0,238	0,751	0,680	0,587	0,497	0,411	0,328	0,177
	35	0,736	0,674	0,591	0,508	0,427	0,347	0,190	0,691	0,621	0,530	0,443	0,359	0,279	0,135
	30	0,684	0,622	0,539	0,458	0,377	0,297	0,142	0,633	0,564	0,475	0,390	0,309	0,232	0,095
45	40	0,736	0,674	0,591	0,508	0,427	0,347	0,190	0,691	0,621	0,530	0,443	0,359	0,279	0,135
	35	0,684	0,622	0,539	0,458	0,377	0,297	0,142	0,633	0,564	0,475	0,390	0,309	0,232	0,095
40	35	0,632	0,570	0,488	0,407	0,327	0,248	0,095	0,575	0,508	0,421	0,339	0,260	0,186	0,059
	30	0,580	0,519	0,437	0,357	0,277	0,199	0,050	0,519	0,454	0,369	0,289	0,213	0,143	0,027
35	30	0,529	0,468	0,387	0,307	0,228	0,151	0,007	0,464	0,400	0,318	0,241	0,169	0,103	0,003



## CORRECTIVE FACTORS FOR VKN2-09/25/LK SILENT HEATERS

SUPPLY AND RETURN TEMPERATURES [°C]		VKN2-09/25/205 SILENT							VKN2-09/25/225 SILENT						
		ROOM AIR TEMPERATURE $\theta_1$ [°C]							ROOM AIR TEMPERATURE $\theta_1$ [°C]						
$t_s$	$t_r$	5	8	12	16	20	24	32	5	8	12	16	20	24	32
90	85	1,790	1,714	1,615	1,516	1,417	1,320	1,129	1,853	1,770	1,661	1,554	1,447	1,343	1,137
	80	1,727	1,652	1,553	1,454	1,357	1,260	1,070	1,784	1,702	1,594	1,487	1,382	1,278	1,075
	75	1,664	1,590	1,491	1,393	1,296	1,200	1,012	1,716	1,634	1,527	1,421	1,317	1,214	1,013
	70	1,602	1,528	1,430	1,332	1,236	1,141	0,954	1,648	1,567	1,461	1,356	1,252	1,150	0,951
85	80	1,664	1,590	1,491	1,393	1,296	1,200	1,012	1,716	1,634	1,527	1,421	1,317	1,214	1,013
	75	1,602	1,528	1,430	1,332	1,236	1,141	0,954	1,648	1,567	1,461	1,356	1,252	1,150	0,951
	70	1,540	1,466	1,369	1,272	1,176	1,082	0,896	1,581	1,500	1,395	1,291	1,188	1,087	0,891
	65	1,479	1,405	1,308	1,212	1,117	1,023	0,839	1,514	1,434	1,330	1,226	1,125	1,025	0,831
80	75	1,540	1,466	1,369	1,272	1,176	1,082	0,896	1,581	1,500	1,395	1,291	1,188	1,087	0,891
	70	1,479	1,405	1,308	1,212	1,117	1,023	0,839	1,514	1,434	1,330	1,226	1,125	1,025	0,831
	65	1,417	1,344	1,248	1,153	1,058	0,965	0,783	1,447	1,369	1,265	1,163	1,062	0,963	0,772
	60	1,357	1,284	1,188	1,094	1,000	0,908	0,727	1,382	1,304	1,201	1,100	1,000	0,903	0,713
75	70	1,417	1,344	1,248	1,153	1,058	0,965	0,783	1,447	1,369	1,265	1,163	1,062	0,963	0,772
	65	1,357	1,284	1,188	1,094	1,000	0,908	0,727	1,382	1,304	1,201	1,100	1,000	0,903	0,713
	60	1,296	1,224	1,129	1,035	0,942	0,851	0,672	1,317	1,239	1,137	1,037	0,939	0,843	0,656
	55	1,236	1,165	1,070	0,977	0,885	0,794	0,617	1,252	1,175	1,075	0,976	0,879	0,783	0,600
70	65	1,296	1,224	1,129	1,035	0,942	0,851	0,672	1,317	1,239	1,137	1,037	0,939	0,843	0,656
	60	1,236	1,165	1,070	0,977	0,885	0,794	0,617	1,252	1,175	1,075	0,976	0,879	0,783	0,600
	55	1,176	1,105	1,012	0,919	0,828	0,738	0,563	1,188	1,112	1,013	0,915	0,819	0,725	0,544
	50	1,117	1,047	0,954	0,862	0,772	0,683	0,510	1,125	1,050	0,951	0,855	0,760	0,667	0,490
65	60	1,176	1,105	1,012	0,919	0,828	0,738	0,563	1,188	1,112	1,013	0,915	0,819	0,725	0,544
	55	1,117	1,047	0,954	0,862	0,772	0,683	0,510	1,125	1,050	0,951	0,855	0,760	0,667	0,490
	50	1,058	0,988	0,896	0,805	0,716	0,628	0,457	1,062	0,988	0,891	0,795	0,702	0,611	0,437
	45	1,000	0,931	0,839	0,749	0,661	0,574	0,405	1,000	0,927	0,831	0,737	0,645	0,555	0,384
60	55	1,058	0,988	0,896	0,805	0,716	0,628	0,457	1,062	0,988	0,891	0,795	0,702	0,611	0,437
	50	1,000	0,931	0,839	0,749	0,661	0,574	0,405	1,000	0,927	0,831	0,737	0,645	0,555	0,384
	45	0,942	0,873	0,783	0,694	0,606	0,520	0,355	0,939	0,867	0,772	0,679	0,588	0,501	0,334
	40	0,885	0,817	0,727	0,639	0,552	0,468	0,305	0,879	0,807	0,713	0,622	0,533	0,447	0,284
55	50	0,942	0,873	0,783	0,694	0,606	0,520	0,355	0,939	0,867	0,772	0,679	0,588	0,501	0,334
	45	0,885	0,817	0,727	0,639	0,552	0,468	0,305	0,879	0,807	0,713	0,622	0,533	0,447	0,284
	40	0,828	0,760	0,672	0,584	0,499	0,416	0,256	0,819	0,748	0,656	0,566	0,479	0,395	0,236
	35	0,772	0,705	0,617	0,531	0,447	0,365	0,209	0,760	0,690	0,600	0,511	0,426	0,344	0,190
50	45	0,828	0,760	0,672	0,584	0,499	0,416	0,256	0,819	0,748	0,656	0,566	0,479	0,395	0,236
	40	0,772	0,705	0,617	0,531	0,447	0,365	0,209	0,760	0,690	0,600	0,511	0,426	0,344	0,190
	35	0,716	0,650	0,563	0,478	0,395	0,315	0,163	0,702	0,633	0,544	0,458	0,374	0,294	0,146
	30	0,661	0,595	0,510	0,426	0,345	0,266	0,119	0,645	0,577	0,490	0,405	0,324	0,246	0,105
40	35	0,606	0,542	0,457	0,375	0,295	0,218	0,077	0,588	0,522	0,437	0,354	0,275	0,199	0,066
	30	0,552	0,489	0,405	0,325	0,247	0,172	0,038	0,533	0,468	0,384	0,304	0,227	0,155	0,031
35	30	0,499	0,436	0,355	0,276	0,200	0,127	0,005	0,479	0,416	0,334	0,255	0,181	0,113	0,003



## CORRECTIVE FACTORS FOR VKN2-09/25/LK SILENT HEATERS

SUPPLY AND RETURN TEMPERATURES [°C]		VKN2-09/25/235 SILENT							VKN2-09/25/250 SILENT						
		ROOM AIR TEMPERATURE $\theta_1$ [°C]							ROOM AIR TEMPERATURE $\theta_1$ [°C]						
$t_s$	$t_r$	5	8	12	16	20	24	32	5	8	12	16	20	24	32
90	85	1,764	1,691	1,595	1,500	1,405	1,311	1,126	1,694	1,630	1,543	1,457	1,372	1,286	1,116
	80	1,704	1,631	1,536	1,441	1,346	1,253	1,068	1,640	1,576	1,490	1,404	1,318	1,233	1,063
	75	1,643	1,571	1,476	1,382	1,288	1,195	1,012	1,586	1,522	1,436	1,350	1,265	1,180	1,011
	70	1,583	1,512	1,417	1,323	1,230	1,137	0,955	1,533	1,468	1,382	1,297	1,212	1,127	0,958
85	80	1,643	1,571	1,476	1,382	1,288	1,195	1,012	1,586	1,522	1,436	1,350	1,265	1,180	1,011
	75	1,583	1,512	1,417	1,323	1,230	1,137	0,955	1,533	1,468	1,382	1,297	1,212	1,127	0,958
	70	1,524	1,453	1,358	1,265	1,172	1,080	0,899	1,479	1,415	1,329	1,244	1,159	1,074	0,906
	65	1,464	1,393	1,300	1,206	1,114	1,023	0,843	1,425	1,361	1,276	1,191	1,106	1,021	0,853
80	75	1,524	1,453	1,358	1,265	1,172	1,080	0,899	1,479	1,415	1,329	1,244	1,159	1,074	0,906
	70	1,464	1,393	1,300	1,206	1,114	1,023	0,843	1,425	1,361	1,276	1,191	1,106	1,021	0,853
	65	1,405	1,335	1,241	1,149	1,057	0,966	0,788	1,372	1,308	1,222	1,138	1,053	0,969	0,801
	60	1,346	1,276	1,183	1,091	1,000	0,910	0,733	1,318	1,254	1,169	1,085	1,000	0,916	0,749
75	70	1,405	1,335	1,241	1,149	1,057	0,966	0,788	1,372	1,308	1,222	1,138	1,053	0,969	0,801
	65	1,346	1,276	1,183	1,091	1,000	0,910	0,733	1,318	1,254	1,169	1,085	1,000	0,916	0,749
	60	1,288	1,218	1,126	1,034	0,944	0,854	0,679	1,265	1,201	1,116	1,032	0,948	0,864	0,697
	55	1,230	1,160	1,068	0,978	0,888	0,799	0,625	1,212	1,148	1,063	0,979	0,895	0,812	0,646
70	65	1,288	1,218	1,126	1,034	0,944	0,854	0,679	1,265	1,201	1,116	1,032	0,948	0,864	0,697
	60	1,230	1,160	1,068	0,978	0,888	0,799	0,625	1,212	1,148	1,063	0,979	0,895	0,812	0,646
	55	1,172	1,103	1,012	0,921	0,832	0,744	0,571	1,159	1,095	1,011	0,927	0,843	0,760	0,594
	50	1,114	1,046	0,955	0,865	0,777	0,689	0,519	1,106	1,042	0,958	0,874	0,791	0,708	0,543
65	60	1,172	1,103	1,012	0,921	0,832	0,744	0,571	1,159	1,095	1,011	0,927	0,843	0,760	0,594
	55	1,114	1,046	0,955	0,865	0,777	0,689	0,519	1,106	1,042	0,958	0,874	0,791	0,708	0,543
	50	1,057	0,989	0,899	0,810	0,722	0,635	0,466	1,053	0,990	0,906	0,822	0,739	0,656	0,492
	45	1,000	0,932	0,843	0,755	0,668	0,582	0,415	1,000	0,937	0,853	0,770	0,687	0,605	0,442
60	55	1,057	0,989	0,899	0,810	0,722	0,635	0,466	1,053	0,990	0,906	0,822	0,739	0,656	0,492
	50	1,000	0,932	0,843	0,755	0,668	0,582	0,415	1,000	0,937	0,853	0,770	0,687	0,605	0,442
	45	0,944	0,876	0,788	0,700	0,614	0,529	0,364	0,948	0,885	0,801	0,718	0,636	0,553	0,391
	40	0,888	0,821	0,733	0,646	0,561	0,477	0,314	0,895	0,832	0,749	0,666	0,584	0,502	0,341
55	50	0,944	0,876	0,788	0,700	0,614	0,529	0,364	0,948	0,885	0,801	0,718	0,636	0,553	0,391
	45	0,888	0,821	0,733	0,646	0,561	0,477	0,314	0,895	0,832	0,749	0,666	0,584	0,502	0,341
	40	0,832	0,766	0,679	0,593	0,508	0,425	0,265	0,843	0,780	0,697	0,615	0,533	0,452	0,291
	35	0,777	0,711	0,625	0,540	0,456	0,374	0,217	0,791	0,728	0,646	0,564	0,482	0,401	0,242
50	45	0,832	0,766	0,679	0,593	0,508	0,425	0,265	0,843	0,780	0,697	0,615	0,533	0,452	0,291
	40	0,777	0,711	0,625	0,540	0,456	0,374	0,217	0,791	0,728	0,646	0,564	0,482	0,401	0,242
	35	0,722	0,657	0,571	0,487	0,405	0,324	0,171	0,739	0,677	0,594	0,513	0,432	0,351	0,193
	30	0,668	0,603	0,519	0,435	0,354	0,275	0,125	0,687	0,625	0,543	0,462	0,381	0,301	0,145
40	35	0,614	0,550	0,466	0,384	0,304	0,227	0,082	0,636	0,574	0,492	0,411	0,331	0,252	0,098
	30	0,561	0,498	0,415	0,334	0,256	0,180	0,041	0,584	0,523	0,442	0,361	0,282	0,203	0,052
35	30	0,508	0,446	0,364	0,285	0,208	0,134	0,005	0,533	0,472	0,391	0,311	0,232	0,155	0,008





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

GRILLE TYPE	CORRECTIVE FACTOR
Roll-up closed profile aluminium grille	1,00
Roll-up double T-bar profile aluminium grille	1,00
Roll-up wooden grille	0,97
Modular aluminium grille	0,99
Linear aluminium grille	0,98
Linear stainless steel grille	0,99

## WATER CAPACITY FOR VKN SILENT HEATERS

HEATER LENGTH Lk [mm]	HEATER TYPE
	VKN2-09/25/Lk SILENT WATER CAPACITY [dm <sup>3</sup> ]
900	0,35
1000	0,40
1250	0,51
1400	0,58
1650	0,58
1900	0,85
2050	0,92
2250	1,01
2350	1,08
2500	1,15

## DECLARED PROPERTIES

Maximum permissible operating pressure: 1,0 MPa

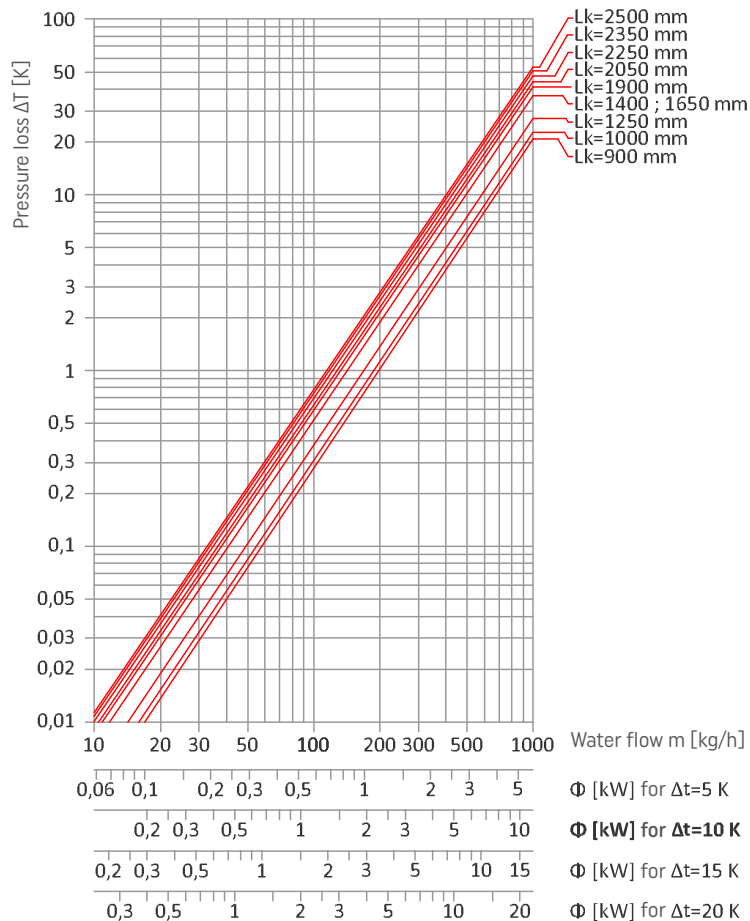
Test pressure: 1,3 MPa

Maximum hydraulic pressure: 1,69 MPa

Maximum operating temperature: 110°C



## PRESSURE LOSSES

VKN2-09/25/Lk SILENT



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