LICON®
member of KORADO Group

KORABASE

Heat exchangers

KORADO®

10/2020

THE KORADO GROUP

50 YEARS OF TRADITION

QUALITY – INTEGRITY – INNOVATION – DESIGN

As a reliable partner, the KORADO Group provides solutions for small- and large-scale heating, cooling and recuperation projects. Innovation is the guarantee of high quality products and modern design, forming the basis of long-term cooperation.

SOLUTIONS FOR BUILDINGS OF ALL TYPES

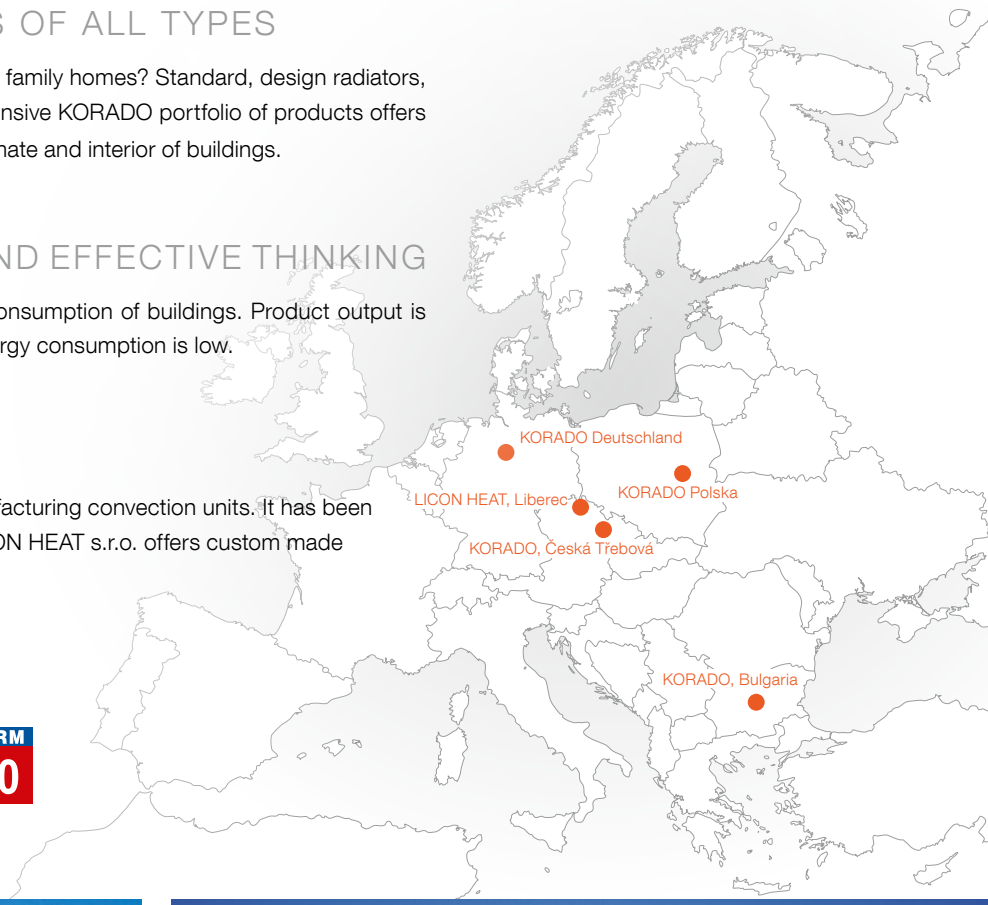
Large projects, such as shopping centres, or small family homes? Standard, design radiators, custom-built convectors or recuperation? The extensive KORADO portfolio of products offers a wide range of technical solutions for the ideal climate and interior of buildings.

ECONOMIC, ECOLOGICAL AND EFFECTIVE THINKING

All products are designed to reduce the energy consumption of buildings. Product output is optimal, air in the room is of a high quality, and energy consumption is low.

LICON HEAT s.r.o.

LICON HEAT s.r.o. has a 50-year tradition of manufacturing convection units. It has been a member of the KORADO Group since 2013. LICON HEAT s.r.o. offers custom made solutions for buildings of all types.

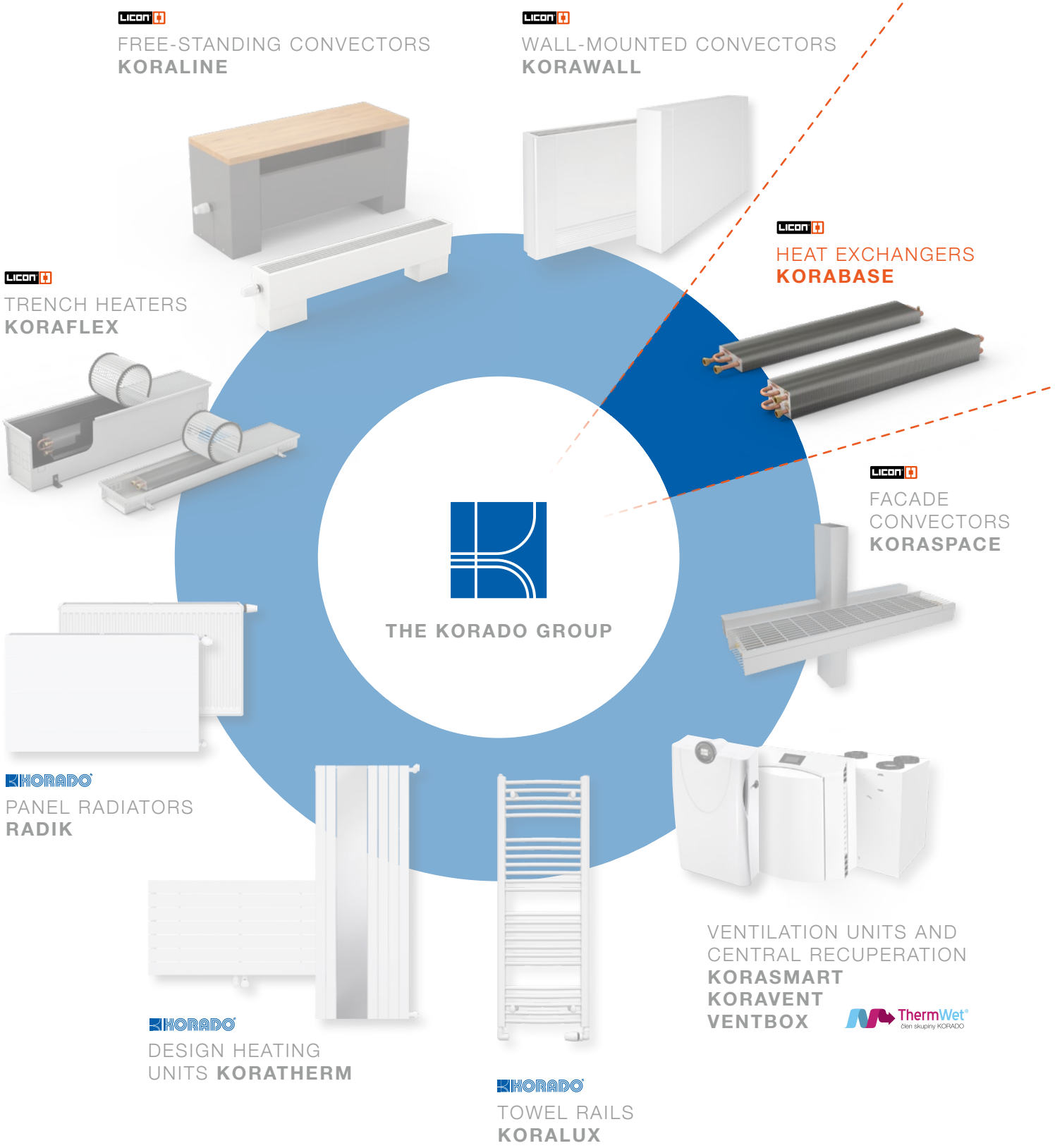


Management kvality
ISO 9001
www.dekra-seal.com

EURONORM
EN 16430

LICON HEAT s.r.o. convectors are sold all over the world. They are manufactured using the most up-to-date technology at LICON HEAT plant in Liberec, Czech Republic.

The KORADO, a.s. Head Office and production site is a modern European plant manufacturing radiators and heating units. The technological equipment and the layout of the 30,000 m² site ensures KORADO, a.s. looks forward to further development and growth.



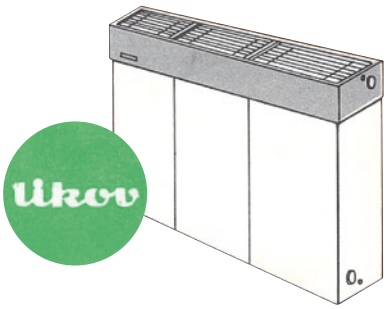
PRODUCT PORTFOLIO

We offer a very wide range of products under one brand enabling comprehensive solutions for all types of building and space, all of which contribute to maximum compatibility, simplicity of design and service, individual solutions and financial savings.

Quality for over 50 years

1968

The **first LIKOV steel convectors** were manufactured in Liberec in 1968. They were marketed under the UNIKONTHERM brand and immediately gained recognition on the heating market.



1995

1995 saw significant **modernisation of our product portfolio**, including the production of our **first trench heaters**, satisfying a demand for design-based solutions.

2004

The company underwent a comprehensive transformation in 2004. **LICON HEAT s.r.o.** replaced the former LIKOV. The **product range was revolutionized** with the introduction of **new heat exchanger technology**, together with **a new business export strategy**.

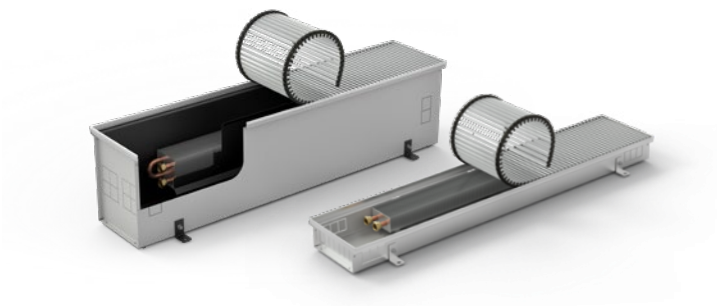
2013

In 2013, **LICON was acquired by KORADO**, marking a milestone in the company's development. This resulted in expansion of the product range.

2018

2018 saw the launch of **a new generation of free-standing convectors**. The product portfolio was expanded with particular emphasis on design.

2020



An innovative **new generation of trench heaters** with natural and forced convection was introduced. There was a significant expansion in the range of trench heaters.

Key to symbols

Convector functions and features

- Natural convection
- Heating
- Higher output
- Environmentally-friendly

Convector design

- ECON — Basic convector design
- EXCL — Convectors with enhanced design or specifications

Why choose LICON convectors?

A solution for every interior…

We offer trench heaters, wall-mounted, free-standing and special convectors, all of which can be installed unobtrusively, including in stylish interiors.

A very wide range…

You can choose from a variety of styles suitable for any interior, including dry and humid environments, and pool-side models. We have convectors and trench heaters that both heat and cool, all available in a wide variety of designs.

An effective heating strategy…

Our convectors offer rapid heat availability, high efficiency, low energy consumption, and economic and environmentally-friendly operation.

The highest technical level…

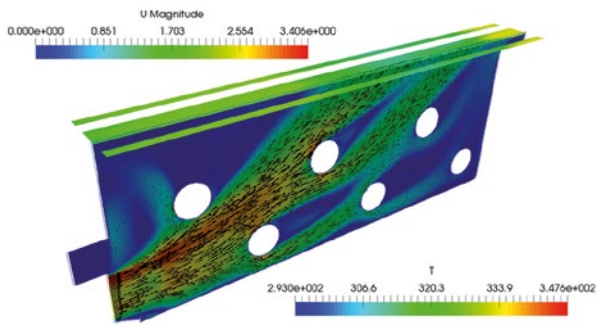
Convectors and trench heaters are compatible with heating systems using all sources of heat (heat pumps, gas, electricity, solar energy, wood and biomass), including heating systems with low temperature gradient. They provide safe solutions, displaying low surface temperatures not exceeding 43 °C. Both the natural convection and forced convection convectors and trench heaters are fitted with quality grilles, including pencil proof options, guaranteeing enhanced user safety.

Straightforward assembly and maintenance.

Did you know?

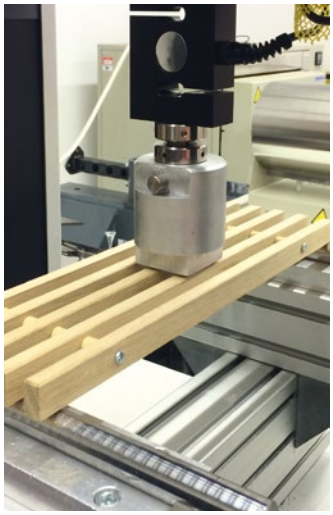
- The KORADO Group has its own research and development centre, equipped with EN 442 thermal output and EN 16430 heat and cooling output test chambers.

- LICON HEAT s.r.o. insists on using the most modern research and development methods, and works closely with leading experts in the field, including higher education institutions (the Technical University of Liberec, the Czech Technical University in Prague, etc.).



- We use the most up-to-date machines for the manufacture of our products, employing the principles of lean production. Products are manufactured in the shortest possible time while maintaining maximum material's and design quality.
- We are a certified ISO 9001 Quality Management supplier. Our products are manufactured and tested according to ČSN EN 442 and ČSN EN 16430 standards. CE marking indicates that LICON convectors conform to the conditions set out in the Declaration of Performance in accordance with Regulation No. 305/2011 of the European Parliament and of the European Council, and further confirmed by notified authority No. 1015, the Engineering Test Institute, Brno.

Thermal imaging measuring

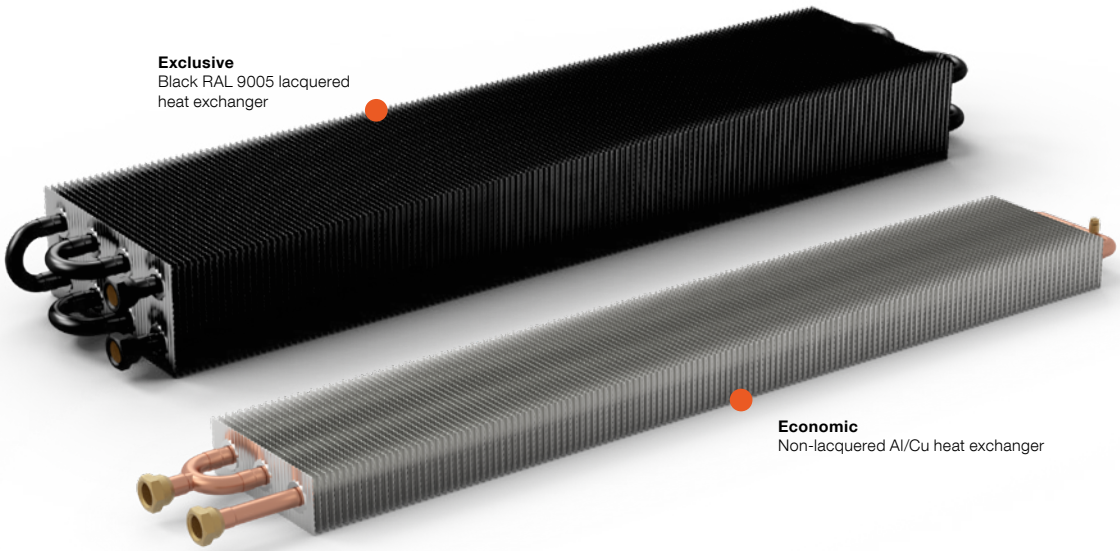


Slats stress test

Customized solutions satisfy the most demanding challenges of interior design.

KORABASE Exclusive
KORABASE Economic

Heat exchangers



HEAT EXCHANGERS

KORABASE Exclusive
KORABASE Economic

The heat exchanger is at the heart of every convector. However, it has a much broader range of applications. Imagine that you want your heating units to blend in almost completely with the interior. Install the heat exchangers in the materials from which the entire interior is made.

KORABASE Exclusive, Economic

Specifications

Unit height	50, 100 mm
Width	50, 100, 150, 200 mm
Length	800, 1 000, 1 200, 1 400, 1 600, 1 800, 2 000, 2 200, 2 400, 2 600, 2 800, 3 000 mm
Output	subject to heat exchanger cover height: see ouput tables and correction factors for box heights
Maximum operating pressure	1.2 MPa
Maximum operating temperature	110 °C
Connecting thread	inner G 1/2"
Ordering code	see page 12 – 13

Description

KORABASE heat exchangers with low water content are ideal for individual installations where there is a requirement for uniformity of materials used in the interior design. Working within a number of principles it is feasible to cover KORABASE heat exchangers with practically any material in order for them to merge into the interior. Heat exchangers are manufactured from copper tubes and aluminium fins.

Standard contents

- Al/Cu heat exchanger with low water content, bleed valve and uniquely shaped fins for higher heat output
- heat exchanger installation instructions
- durable PVC packaging with protective edge covers

Optional accessories

- wall and floor brackets for mounting heat exchanger (see page 12)

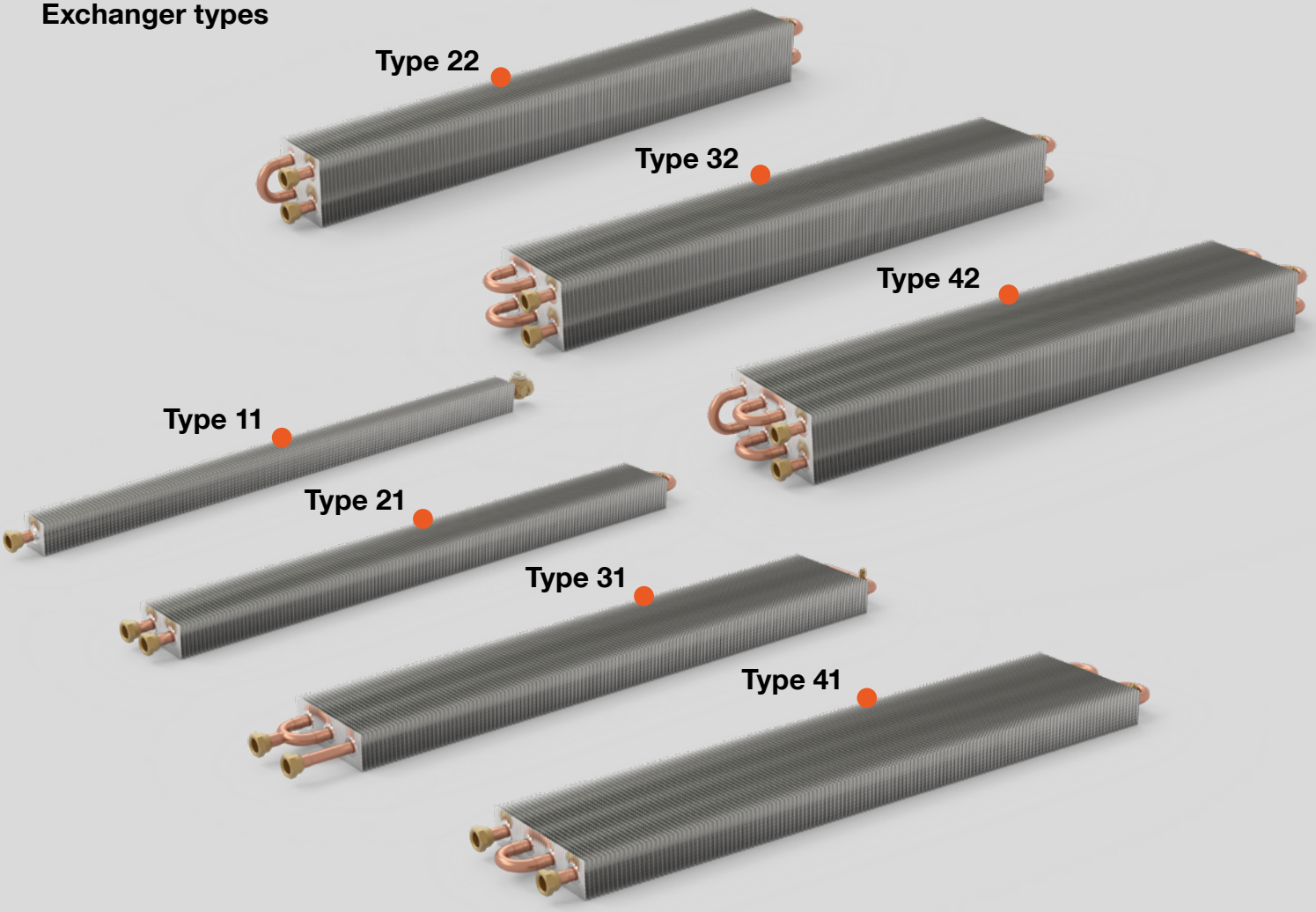
KORABASE Exclusive version

Black RAL 9005 lacquered heat exchanger

KORABASE Economic version

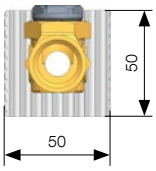
Non-lacquered Al/Cu heat exchanger

Exchanger types

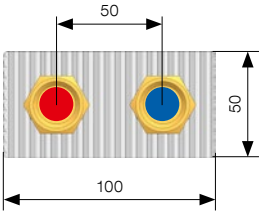


PRODUCT RANGE

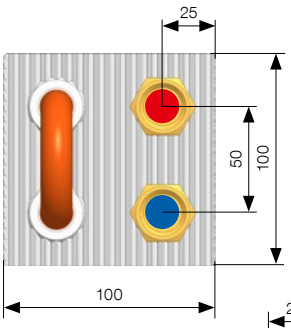
type 11



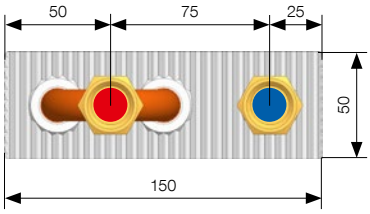
type 21



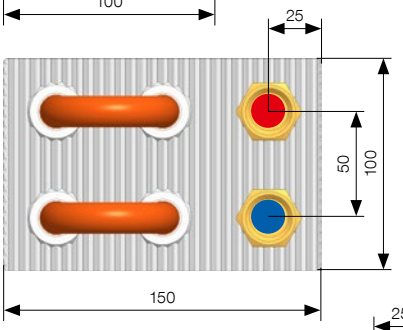
type 22



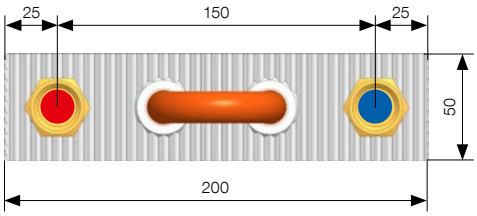
type 31



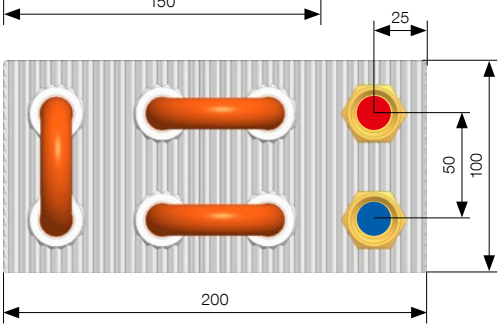
type 32



type 41



type 42



HEAT OUTPUT

Heat output [W] at $t_1/t_2/t_i$ = at 75/65/20 °C (Δt=50), 65/55/20 °C (Δt=40) and 55/45/20 °C (Δt=30) / EN 442
Outputs in the table are specified for the convector box height 200 mm

KORABASE Exclusive, KORABASE Economic								
Length	$t_1/t_2/t_i$ [°C]	BP 11	BV/BP 21	BV/BP 22	BV/BP 31	BV/BP 32	BV/BP 41	BV/BP 42
		Width × height 50 × 50	Width × height 100 × 50	Width × height 100 × 100	Width × height 150 × 50	Width × height 150 × 100	Width × height 200 × 50	Width × height 200 × 100
800	**75/65/20**	**222**	**478**	**622**	**669**	**969**	**989**	**1314**
	65/55/20	164	356	453	499	705	744	958
	55/45/20	112	244	302	342	468	516	638
1 000	**75/65/20**	**285**	**613**	**800**	**870**	**1248**	**1274**	**1692**
	65/55/20	211	457	584	648	908	959	1234
	55/45/20	143	313	388	444	602	665	822
1 200	**75/65/20**	**348**	**748**	**979**	**1070**	**1526**	**1558**	**2070**
	65/55/20	258	558	714	798	1110	1173	1510
	55/45/20	175	382	475	546	737	813	1005
1 400	**75/65/20**	**411**	**883**	**1158**	**1271**	**1805**	**1843**	**2448**
	65/55/20	305	659	845	947	1313	1387	1786
	55/45/20	207	451	562	648	871	962	1189
1 600	**75/65/20**	**475**	**1019**	**1337**	**1471**	**2084**	**2128**	**2826**
	65/55/20	351	759	975	1096	1516	1601	2062
	55/45/20	239	520	649	751	1006	1110	1373
1 800	**75/65/20**	**538**	**1154**	**1516**	**1672**	**2363**	**2412**	**3204**
	65/55/20	398	860	1105	1246	1719	1816	2337
	55/45/20	270	589	736	853	1140	1259	1556
2 000	**75/65/20**	**601**	**1289**	**1695**	**1872**	**2641**	**2697**	**3582**
	65/55/20	445	961	1236	1395	1921	2030	2613
	55/45/20	302	658	823	955	1275	1407	1740
2 200	**75/65/20**	**664**	**1424**	**1874**	**2073**	**2920**	**2981**	**3961**
	65/55/20	492	1062	1366	1545	2124	2244	2889
	55/45/20	334	727	909	1057	1409	1556	1924
2 400	**75/65/20**	**727**	**1559**	**2052**	**2273**	**3199**	**3266**	**4339**
	65/55/20	539	1163	1497	1694	2327	2458	3165
	55/45/20	366	796	996	1160	1544	1704	2107
2 600	**75/65/20**	**790**	**1695**	**2231**	**2473**	**3478**	**3551**	**4717**
	65/55/20	585	1263	1627	1843	2530	2672	3441
	55/45/20	398	865	1083	1262	1678	1853	2291
2 800	**75/65/20**	**853**	**1830**	**2410**	**2674**	**3757**	**3835**	**5095**
	65/55/20	632	1364	1758	1993	2733	2887	3716
	55/45/20	429	934	1170	1364	1813	2001	2475
3 000	**75/65/20**	**917**	**1965**	**2589**	**2874**	**4035**	**4120**	**5473**
	65/55/20	679	1465	1888	2142	2935	3101	3992
	55/45/20	461	1003	1257	1466	1948	2150	2658
Temperature exponent n [-]		**1.3452**	**1.3162**	**1.4151**	**1.3176**	**1.4262**	**1.2735**	**1.4137**

Measurements show in mm BV = korabase reversible connection method; BP = KORABASE continuous connection method.

example

For other box height conversions, see page 18 or www.licon.cz

For thermal gradient conversions, see page 18 or www.licon.cz

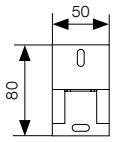
TECHNICAL DATA

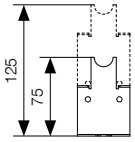
KORABASE Exclusive, KORABASE Economic							
Type of exchanger	**11**	**21**	**31**	**41**	**22**	**32**	**42**
Temperature exponent n [-]	1.3452	1.3162	1.3176	1.2735	1.4151	1.4262	1.4137
K_M [-]	2.4594	5.9134	8.4942	14.5964	5.2713	7.8670	11.2041
Characteristic equation	$\phi = K_M \cdot \Delta T^n$						
Unit weight [kg/m]	1.087	1.884	2.699	3.637	3.604	5.368	7.131
Water volume [l/m]	0.146	0.298	0.450	0.602	0.602	0.907	1.211
Effective heat exchanger area [mm]	L-97	L-93	L-132	L-105	L-105	L-105	L-105

OPTIONAL ACCESSORIES – BRACKETS

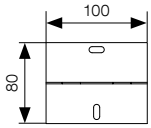
Floor brackets

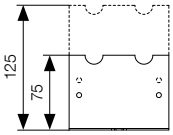
- optional accessories
- for heat exchangers 1 800 mm and longer, a minimum of three floor brackets is required.
- black RAL 9005 lacquered as standard

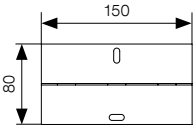


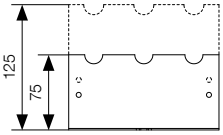


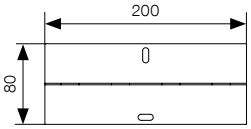
floor bracket height	75	125	75	125
for type	11	11	21 and 22	21 and 22
order code	BVS-1-7	BVS-1-12	BVS-2-7	BVS-2-12

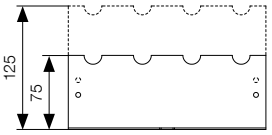








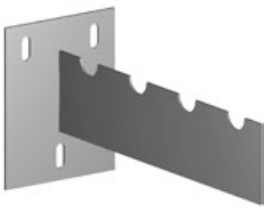


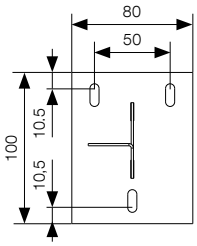


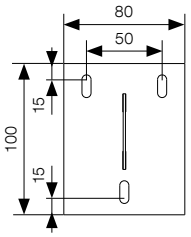
floor bracket height	75	125	75	125
for type	31 and 32	31 and 32	41 and 42	41 and 42
order code	BVS-3-7	BVS-3-12	BVS-4-7	BVS-4-12

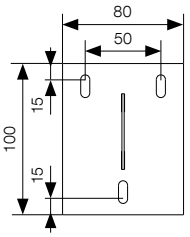
Wall brackets

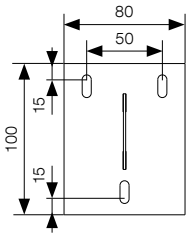
- optional accessories
- for heat exchangers 1 800 mm and longer, a minimum of three wall brackets is required.
- RAL 9016 lacquered as standard

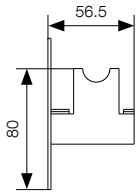


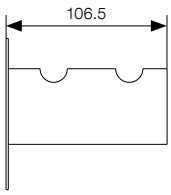


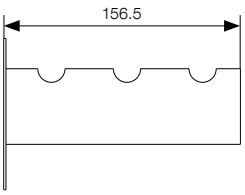


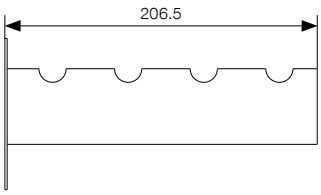












for type	11	21 and 22	31 and 32	41 and 42
order code	BVK-1	BVK-2	BVK-3	BVK-4

Measurements shown in mm.

INSTALLATION

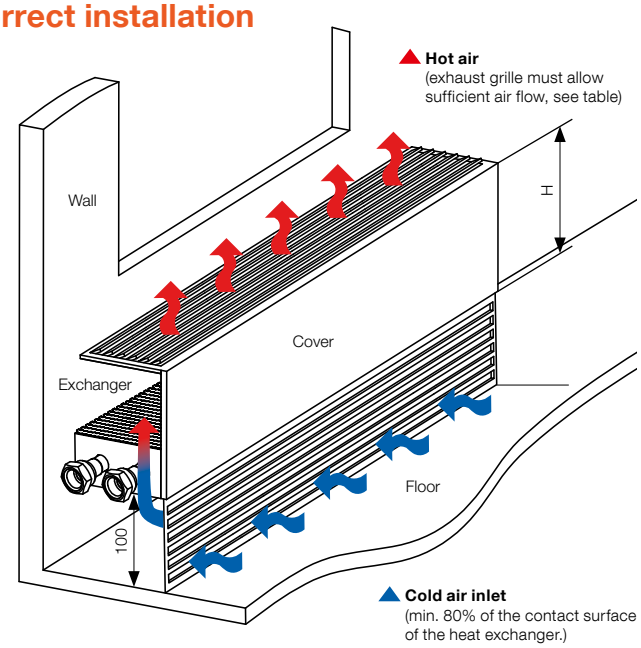
Installation instructions

To ensure correct operation and maximum heat output it is necessary to install a sufficiently sealed box with input and exhaust grilles allowing sufficient throughput of air. The input grille should equate to a minimum of 80 % of the contact surface of the heat exchanger.

We recommend mounting the heat exchanger on floor or wall brackets 10cm above floor level. Two types of bracket are available: floor-level brackets (7.5 and 12.5 cm in height), and wall brackets. The width of the heat exchanger determines the length of the brackets (56.5 cm – 206.5 mm). Brackets not included in delivery.

Heat exchanger heat output depends on a number of factors: effective cover height, cover (box) sealing, input of heated air and surface area of the exhaust grille. The general rule is that the higher the cover is, the higher the heat output. The convector box and surrounding building materials must be resistant to the heat created by the heat exchanger.

Correct installation



Correction factor (kH) for differeing box heights (H)

Correction factor	$t_1/t_2/t_i$	Box height H [mm]								
		200	250	300	350	400	450	500	550	600
kH	75/65/20	1.000	1.059	1.116	1.171	1.224	1.278	1.331	1.384	1.438

Box height (H) is measured from the lower edge of the heat exchanger fins.
Example: KORABASE 31, length 180 mm, box height 0.45 heat output conversion:
Q = 1672 × 1.278 = 2 137 W.

Air outlet grille correction factor

% of the air inlet surface	> 75	60	50	40	30
correction factor	1.00	0.95	0.90	0.85	0.60

The air inlet surface is the flow area of the exchanger (width × length of the heating unit) minus the area of the exhaust grille (all measurements shwon in %). The output of the given convector is multiplied by the correction factor. Outputs of heat exchangers are measured including the exhaust grille, and so it is not necessary to convert them further.

ORDER CODE

KORABASE heat exchanger	Method of connection	Version	Length [cm]	Type	Surface finish - heat exchanger
B	V = counter-flow P = single-stream	E = Economic X = Exlusive	– ... – ..		–0– 00 = non-lacquered 39 = black RAL 9005 lacq.

Order code example BVE-180-42-0-00
Economic heat exchanger, counter-flow, type 42 (4 horizontal and 2 vertical lines), length 1 800 mm, non-lacquered Al/Cu.

Order code example BPX-100-21-0-39
Exclusive heat exchanger, single-stream, type 21 (2 horizontal and 1 vertical rows), length 1 000 mm, RAL 9005 lacquered.

HEAT EXCHANGER PRESSURE LOSSES

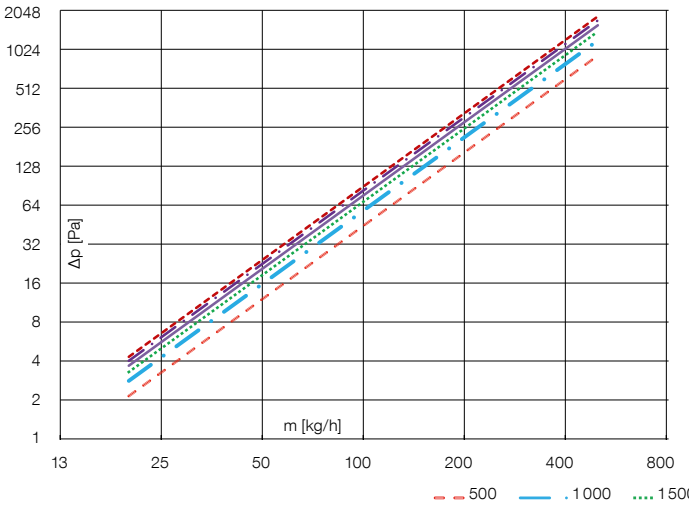
KORABASE type 11 – 50 × 50 mm (height/width)

Length L [mm]	Mass flow rate [kg/h]											
	20	40	80	100	150	200	250	300	350	400	450	500
	Exchanger pressure losses Δp [Pa]											
800	3	9	35	53	114	196	298	420	561	722	901	1098
1000	3	10	38	58	124	214	325	458	612	787	983	1198
1200	3	11	41	62	134	229	349	492	657	845	1055	1286
1400	3	12	43	66	142	244	371	522	698	898	1120	1366
1600	3	12	46	70	149	257	390	550	735	945	1180	1439
1800	4	13	48	73	156	269	409	576	770	990	1235	1506
2000	4	14	50	76	163	280	426	600	802	1031	1287	1569
2200	4	14	52	79	169	290	442	623	832	1070	1336	1629
2400	4	15	54	82	175	300	457	644	861	1107	1382	1685
2600	4	15	55	84	180	310	472	665	888	1142	1426	1738
2800	4	15	57	87	186	319	486	684	914	1176	1467	1789
3000	4	16	58	89	191	328	499	703	939	1208	1507	1838

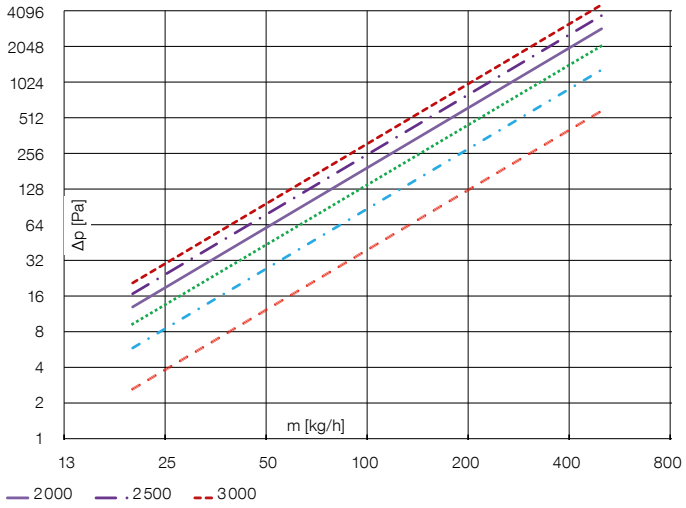
KORABASE type 21 – 100 × 50 mm (height/width)

Length L [mm]	Mass flow rate m [kg/h]											
	20	40	80	100	150	200	250	300	350	400	450	500
	Exchanger pressure losses Δp [Pa]											
800	5	14	46	67	133	216	314	426	552	691	842	1005
1000	6	19	60	87	172	279	406	551	714	893	1089	1300
1200	7	23	74	107	212	344	500	680	881	1102	1343	1604
1400	9	27	88	128	253	411	598	812	1052	1316	1604	1915
1600	10	32	103	149	295	479	697	947	1226	1535	1871	2233
1800	11	37	118	171	338	549	798	1084	1405	1758	2143	2558
2000	13	41	133	193	382	619	901	1224	1586	1985	2419	2887
2200	14	46	148	216	426	691	1005	1366	1770	2215	2700	3222
2400	16	51	164	238	471	764	1111	1510	1956	2448	2984	3562
2600	17	56	180	261	517	838	1219	1656	2145	2685	3272	3906
2800	19	61	196	285	563	912	1327	1803	2336	2924	3564	4254
3000	21	66	212	308	609	988	1437	1952	2529	3165	3858	4605

KORABASE type 11



KORABASE type 21



HEAT EXCHANGER PRESSURE LOSSES

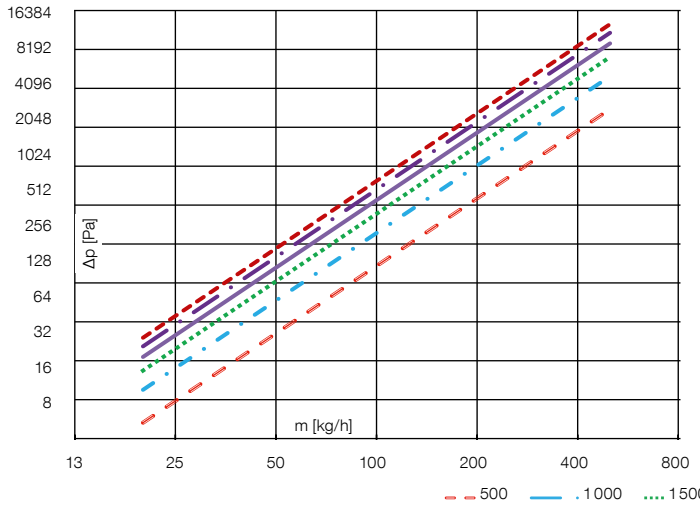
KORABASE type 31 – 150 × 50 mm (height/width)

Length L [mm]	Mass flow rate m [kg/h]											
	20	40	80	100	150	200	250	300	350	400	450	500
	Exchanger pressure losses Δp [Pa]											
800	6	19	63	93	190	315	465	640	839	1060	1302	1566
1000	6	21	71	104	212	351	519	714	935	1181	1452	1746
1200	7	23	77	114	232	384	567	780	1022	1291	1587	1909
1400	7	25	83	123	250	414	611	841	1102	1392	1711	2058
1600	8	26	89	131	267	441	652	898	1176	1486	1826	2196
1800	8	28	94	139	282	467	691	951	1246	1574	1934	2326
2000	9	29	99	146	297	492	727	1001	1311	1657	2036	2449
2200	9	31	104	153	311	515	762	1049	1374	1736	2133	2566
2400	10	32	108	160	325	538	795	1094	1433	1811	2226	2677
2600	10	33	112	166	338	559	827	1138	1490	1883	2314	2783
2800	10	35	117	172	350	580	857	1180	1545	1952	2400	2886
3000	11	36	120	178	362	600	886	1220	1598	2019	2482	2985

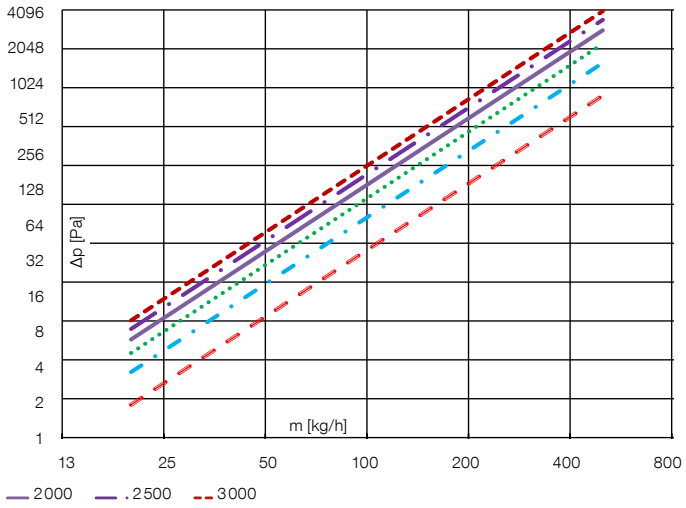
KORABASE type 41 – 200 × 50 mm (height/width)

Length L [mm]	Mass flow rate m [kg/h]											
	20	40	80	100	150	200	250	300	350	400	450	500
	Exchanger pressure losses Δp [Pa]											
800	11	35	115	168	336	550	806	1102	1435	1803	2206	2643
1000	13	42	138	202	405	663	972	1329	1730	2175	2661	3187
1200	15	49	161	236	472	773	1133	1548	2016	2534	3100	3713
1400	17	56	183	268	538	880	1289	1762	2294	2884	3528	4226
1600	19	63	205	300	601	984	1442	1971	2566	3226	3947	4727
1800	21	69	226	331	664	1086	1592	2175	2833	3561	4356	5218
2000	23	75	247	362	725	1187	1739	2376	3095	3890	4759	5700
2200	25	82	268	392	785	1286	1884	2574	3352	4213	5155	6175
2400	27	88	288	422	845	1383	2027	2769	3606	4532	5546	6642
2600	29	94	308	451	904	1479	2167	2962	3856	4847	5931	7103
2800	31	100	328	480	962	1574	2306	3152	4104	5158	6311	7559
3000	32	106	347	509	1019	1668	2444	3339	4348	5466	6687	8010

KORABASE type 31



KORABASE type 41



500 1000 1500 2000 2500 3000

HEAT EXCHANGER PRESSURE LOSSES

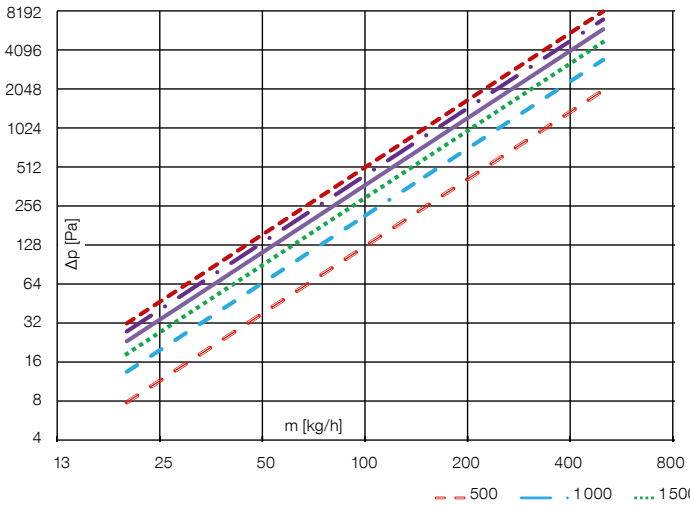
KORABASE type 22 – 100 × 100 mm (height/width)

Length L [mm]	Mass flow rate m [kg/h]											
	20	40	80	100	150	200	250	300	350	400	450	500
	Exchanger pressure losses Δp [Pa]											
800	11	37	123	180	363	595	874	1197	1561	1964	2406	2885
1000	13	44	146	215	432	709	1041	1425	1859	2339	2865	3436
1200	16	51	169	248	498	818	1201	1644	2144	2698	3305	3963
1400	18	58	190	280	562	923	1355	1855	2419	3044	3729	4471
1600	19	64	211	311	624	1024	1505	2059	2686	3380	4140	4964
1800	21	70	232	341	685	1123	1650	2258	2945	3707	4540	5443
2000	23	76	252	370	743	1220	1792	2453	3198	4025	4930	5911
2200	25	82	271	398	801	1315	1931	2643	3446	4337	5312	6369
2400	27	88	290	427	857	1407	2067	2829	3689	4643	5687	6818
2600	28	94	309	454	913	1498	2200	3012	3928	4943	6055	7259
2800	30	99	328	481	967	1588	2332	3192	4162	5238	6416	7693
3000	32	105	346	508	1021	1676	2461	3369	4393	5529	6773	8120

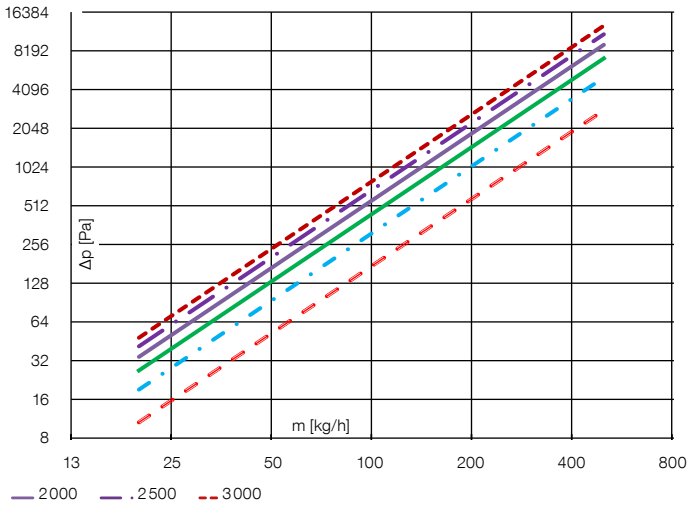
KORABASE type 32 – 150 × 100 mm (height/width)

Length L [mm]	Mass flow rate m [kg/h]											
	20	40	80	100	150	200	250	300	350	400	450	500
	Exchanger pressure losses Δp [Pa]											
800	16	53	175	258	521	858	1264	1734	2266	2856	3504	4207
1000	19	63	211	311	629	1036	1526	2094	2736	3449	4231	5080
1200	22	74	246	363	734	1208	1780	2442	3191	4023	4936	5926
1400	25	84	281	413	836	1377	2027	2782	3635	4583	5622	6750
1600	28	94	314	463	935	1541	2270	3114	4069	5130	6293	7556
1800	31	104	347	511	1033	1702	2507	3440	4495	5667	6952	8346
2000	34	114	379	559	1129	1861	2740	3760	4913	6194	7599	9123
2200	37	124	411	606	1224	2017	2970	4075	5325	6714	8236	9888
2400	40	133	443	652	1317	2170	3197	4386	5731	7226	8864	10642
2600	43	142	474	697	1410	2322	3420	4693	6132	7731	9484	11387
2800	45	151	504	743	1501	2472	3641	4996	6528	8231	10097	12122
3000	48	161	534	787	1591	2621	3860	5296	6920	8725	10703	12850

KORABASE type 22



KORABASE type 32



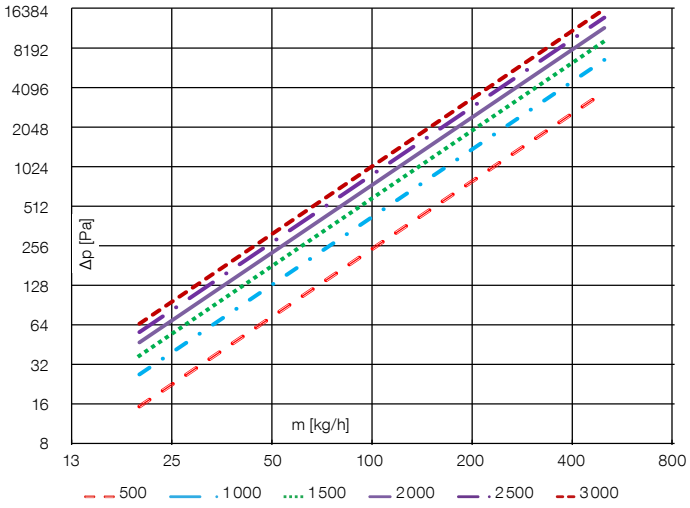
500 1000 1500 2000 2500 3000

HEAT EXCHANGER PRESSURE LOSSES

KORABASE type 42 – 200 × 100 mm (height/width)

Length L [mm]	Mass flow rate m [kg/h]											
	20	**40**	**80**	**100**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**
	Exchanger pressure losses Δp [Pa]											
800	22	73	241	352	706	1155	1692	2311	3009	3782	4627	5541
1000	27	88	288	422	845	1383	2026	2768	3604	4530	5542	6637
1200	31	102	334	489	979	1603	2348	3208	4177	5249	6422	7692
1400	35	115	378	554	1109	1815	2660	3634	4731	5946	7275	8713
1600	39	129	421	617	1236	2022	2963	4048	5271	6624	8104	9706
1800	43	141	463	679	1359	2224	3259	4453	5797	7286	8914	10676
2000	47	154	505	739	1480	2422	3549	4849	6313	7934	9707	11625
2200	51	166	545	799	1599	2616	3833	5237	6819	8570	10484	12556
2400	54	179	585	857	1715	2807	4112	5619	7316	9194	11248	13472
2600	58	190	624	914	1830	2994	4387	5995	7805	9809	12000	14372
2800	62	202	662	971	1943	3179	4658	6365	8287	10415	12742	15260
3000	65	214	700	1026	2054	3362	4926	6730	8762	11012	13473	16135

KORABASE type 42



TEMPERATURE GRADIENT CONVERSIONS

The heat output of individual heat exchangers is determined by measuring nominal operating (temperature) conditions of 75/65/20 °C ($t_1/t_2/t_3$) in accordance with ČSN EN 442. In accordance with these principal values for the thermal output of heat exchangers, further temperature gradients of 65/55/20 °C and 55/45/20 °C were achieved by converting corresponding heat outputs as listed in this catalogue. Where heating units are designed for other thermal conditions, the following conversions will be necessary:

1 $$\Delta t = \frac{(t_1 + t_2)}{2} - t_i$$

2 $$f = \left(\frac{\Delta t}{50}\right)^n$$

3 $$Q = f \cdot Q_n$$

4 $$m = 0.86 \cdot \frac{Q}{t_1 - t_2}$$

t_1	[°C]	input water temperature
t_2	[°C]	output water temperature
t_i	[°C]	ambient air temperature
Δt	[K]	temperature gradient
n	[-]	temperature exponent
f	[-]	conversion coefficient
Q_n	[W]	nominal heat output at 75/65/20 °C
Q	[W]	heat output at new temperature gradient
m	[kg/h]	massflow rate

Output may also be calculated using the characteristic equation as shown in the table of specifications, or by visiting **www.licon.cz**

Example

Values given

- heat exchanger KORABASE BV 22 length 160
- input water temperature $t_1 = 60$ °C
- nominal output $Q_n = 1\ 337$ W
- output water temperature $t_2 = 50$ °C
- temperature exponent $n = 1.4151$
- ambient air temperature $t_i = 22$ °C

Solution

To achieve 60/50/22°C operating conditions, calculate temperature gradient **Δt** according to formula 1 and conversion coefficient value **f** according to formula 2

1 $$\Delta t = \frac{(t_1 + t_2)}{2} - t_i = \frac{(60 + 50)}{2} - 22 = 33\ \text{K}$$

Temperature exponent **n** for the required heat exchanger dimensions can be found in the output table. The table also shows coefficient **f** for selected temperature gradients.

2 $$f = \left(\frac{\Delta t}{50}\right)^n = \left(\frac{33}{50}\right)^{1.4151} = 0.5554$$

Output for required temperature gradient is calculated as follows:

3 $$Q = f \cdot Q_n = 0.5554 \cdot 1\ 337 = 742\ \text{W}$$

Conversion coefficient f for selected temperature gradients for ambient air temperature of 20 °C

KORABASE BV and BP					
Type	**90/70 °C**	**85/75 °C**	**70/50 °C**	**50/40 °C**	**45/35 °C**
11	1.278	1.278	0.741	0.394	0.292
21	1.271	1.271	0.745	0.402	0.299
22	1.294	1.294	0.729	0.375	0.273
31	1.272	1.272	0.745	0.401	0.299
32	1.297	1.297	0.727	0.372	0.271
41	1.261	1.261	0.753	0.414	0.311
42	1.294	1.294	0.729	0.375	0.274

Warranty

The warranty period is two years. 10 year guarantee against exchanger leaks. For full details of operating and warranty conditions, please visit www.licon.cz. The manufacturer accepts no liability for damage resulting from transport, incorrect assembly, incorrect electrical connection or heat system installation (ie, voltage fluctuation or variable hydraulic pressure significantly outwith normal values). LICON reserves the right to alter specifications without notice.

Custom manufacturing

The use of cutting edge technologies enables us to manufacture custom-made convectors.

Heat exhangers which merge seamlessly into the interior and boast a wide range of applications. Install heat exchangers exactly where you want them.

member of KORADO Group

LICON HEAT, s. r. o.
Svárovská 699
Průmyslová zóna Sever
Liberec 11
460 11, Czech Republic
e-mail: info@licon.cz
www.licon.cz
02.10/2020