



18.05.2022

Radiators



kalde[®]

First Choice

Why Kalde?

Kalde produces high quality products, designs and develops integrated solutions for customers worldwide.

It is among the leading companies in production of pipes and fittings with its knowledge and expertise of more than 40 years.

The headquarters of the company is located in Istanbul where the continents of Asia and Europe meet.

Our strategical location at the junction of Europe, Asia and Africa together with a reliable supply chain give us unique advantages in providing our business partners and customers with high quality service as well as the competition in the global markets. Currently, our products are exported to more than 40 countries worldwide including Germany, Hungary, Romania, Austria, Greece, Bulgaria, Russia, Ukraine, Egypt, Syria, Lebanon, etc.

Kalde has product design, development and quality control facilities in 300.000 m².

Kalde produces a wide range of products including PP-R pipes, PP-R fittings, PP-R and brass valves, Al-pex & PE-RT pipes, screw fittings, press fittings, PE-X pipes and collectors. Kalde has internationally accredited certificates from respected organisations such as DVGW SKZ (Germany), CSTB (France) and AENOR (Spain). Furthermore, our management system has been certified by ISO. We are proud of our high quality products and experiences...

Our vision is providing our customers with an increasingly wide portfolio of high quality products and solutions with continuous research and development.

Our goal is to develop long term partnerships with our customers and suppliers.

We create integrated solutions by team work as well as collaboration with our customers and partners.

Having market-focused teams of around 1500 professionals supported by a strong management, we offer our business partners and customers worldwide with value-adding solutions.

As result of these reasons, **kalde** Kalde is the "First Choice" of the users worldwide

Kalde Value Commitment.

Kalde was established by four young engineers dedicated to provide customers with the best service in 1977.

This spirit is still alive and is the essence of our mission statement.

The Success of Kalde is the Result of Various Factors.

- **High quality** products.
- Utilization of best **practices**.
- Products meeting your **unique** requirements.
- **Proven** products.
- **Total** customer satisfaction.
- **Long term** relationships with each customer.
- A **dedicated** team of around 1500 professionals.

● Contents

Kalde Steel Panel Radiator

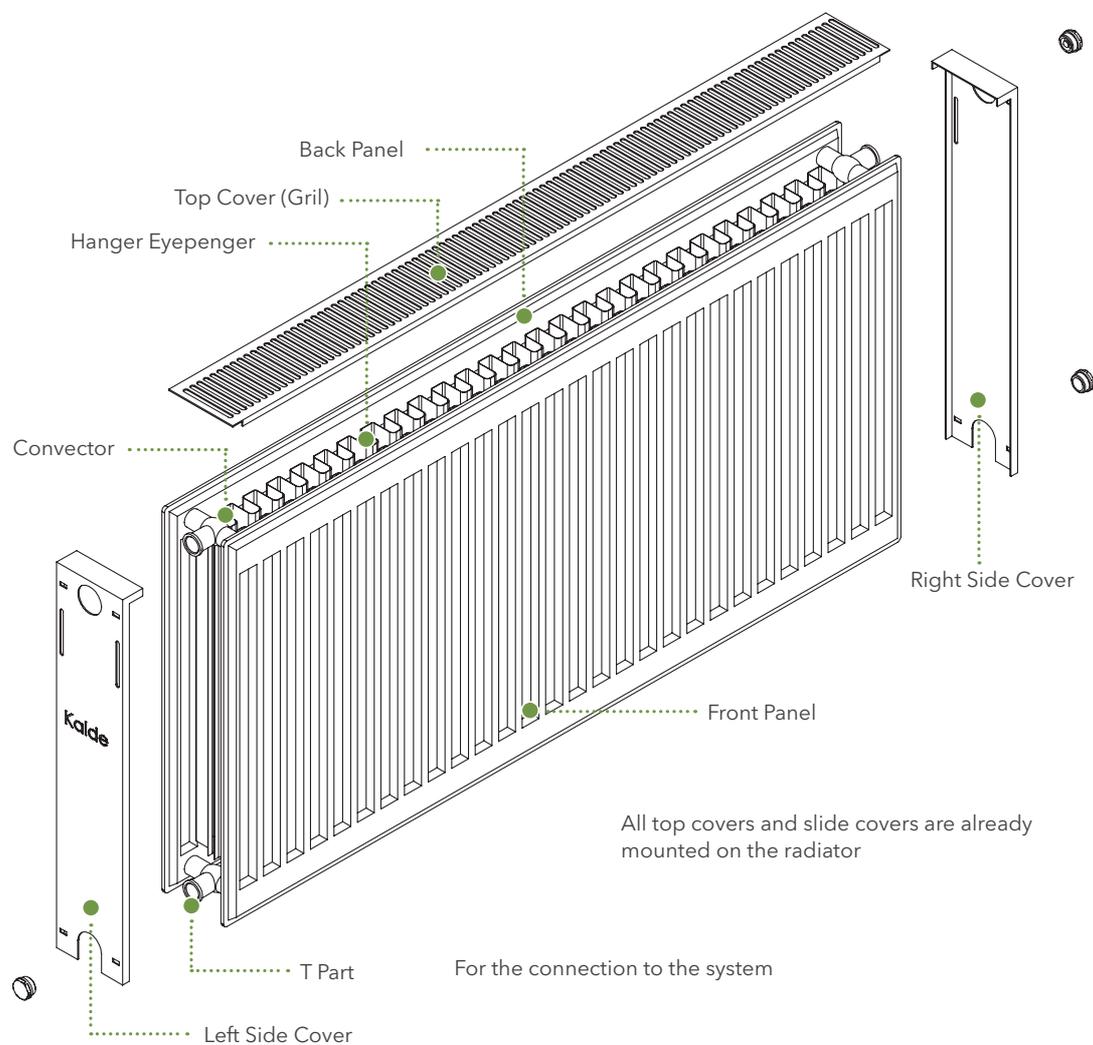
6

Radiators

Kalde Steel Panel Radiator

Technical Specifications

Kalde steel panel radiators are produced with fully integrated and fully automated lines under PLC supervision which use latest technologies in compliance with BS, DIN EN 442 norms. The radiators come in two different heights (300 mm, 400 mm, 500 mm, 600 mm and 900 mm) and 27 different lengths (from 400 mm to 3,000 mm increasing by 100 mm). They are produced with German made presses and moulding equipment specially designed for panel radiator. To provide maximum heat output capacity, we use high quality steel sheets produced specifically for panel radiators and wide surface convectors, and raw materials that comply with EN norms.



Both the radiator's inner and outer surfaces are fully cleaned and purified by dipping, spray oil taking, phosphatizing and passivation conforming to DIN 55900. As a result, the whole surface of the radiator is totally purified from any chemical substances that might effect the quality of the paint. A premier coating is applied by dipping. The radiators then pass through a furnace, and are painted in climatized cabinets by robotic pistols with electrostatic powder paint and are furnished again.

Radiators

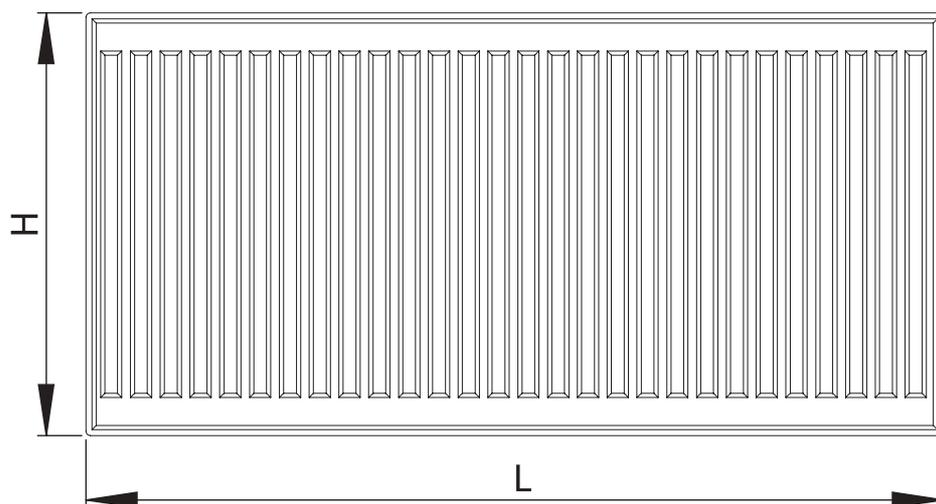
Thickness of the panel steel plate	1,11 ± 0,09 mm
Thickness of the convector steel plate	0,30 ± 0,09 mm
Thickness of the grill and side cover steel plate	0,50 ± 0,09 mm
Maximum working temperature	120 °C
Maximum working pressure	10 Bars
Test pressure	13 Bars

Dimensions

Standart heights are (H) 300 - 400 - 500 - 600 and 900 mm

Standart lengths are (L) From 400 to 3,000 mm in 100 mm increments

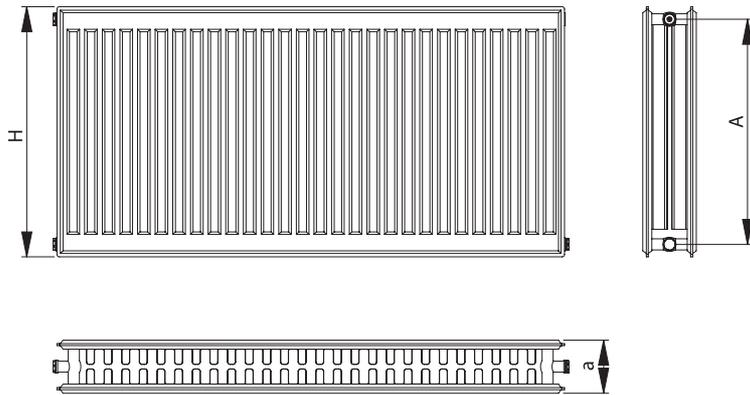
Produced with fully automated Italian robot welding machinery, each radiator is tested fully under 13 bars.



Radiators

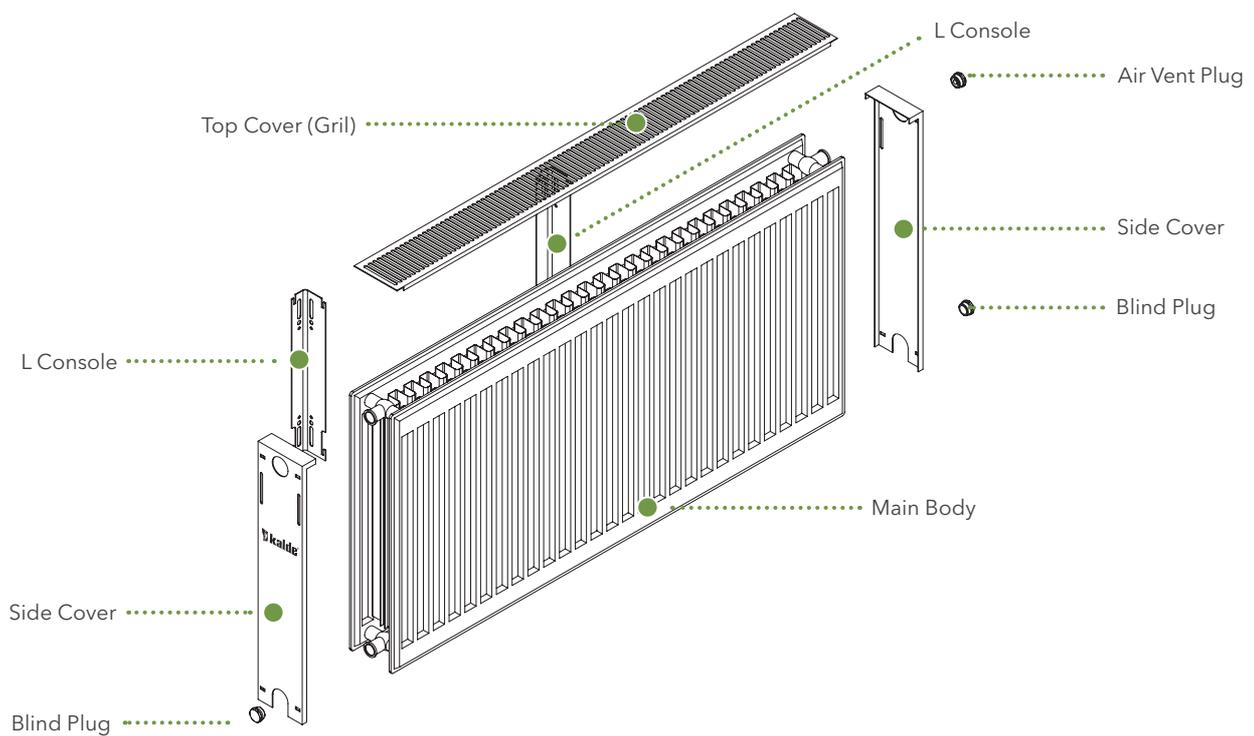
Type

Type 22 is connected from the holes to the installation system using T type welded connection parts. T parts enable the radiator to be connected to different shapes. This provides the flexibility to connect the radiator to different installation systems under different positions.



Type 22 DPDC

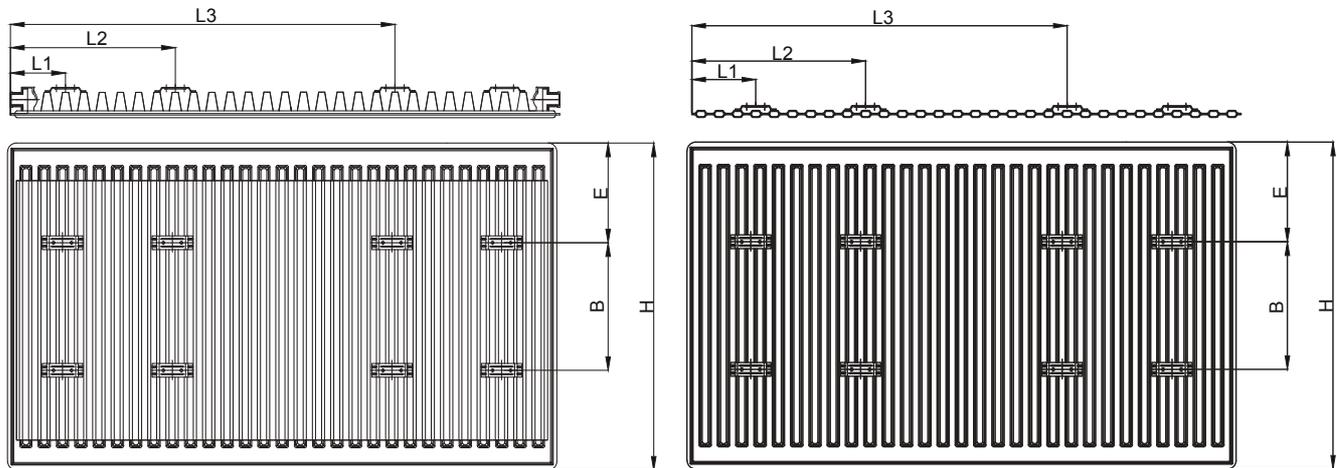
Height H (mm)	Axis Range A (mm)	Width a (mm)	Weight (kg/m)	Water Content (mt/lt)
300	245	100	15,30	3,25
400	345	100	20,15	4,10
500	450	100	25,10	5,25
600	545	100	29,90	6,10
900	845	100	44,95	8,30



Radiators

Packing and Assembly

The radiators have side covers and top grills which can be easily mounted to the body. They are protected from outer impacts by cardboard carton and plastic cover for hangers, and are also wrapped in nylon against dust and humidity. Inside the radiator, you will find a full assembly set including air vent plug, blind plug, screws, dowels, suspension brace clamp for easy installation. Our packaging system with added protection also enables the radiators to be assembled to the wall while the packaging is still on the radiator giving protection against dust, external effects and other impacts during the construction phase of the house.



Type 10 - 20 - 21 - 22 - 33				
L	Pcs.	L1	L2	L3
400	4	116.5	283.5	-
500	4	116.5	383.5	-
600	4	116.5	483.5	-
700	4	116.5	583.5	-
800	4	116.5	683.5	-
900	4	116.5	783.5	-
1000	4	116.5	883.5	-
1100	4	116.5	983.5	-
1200	4	116.5	1083.5	-
1300	4	116.5	1183.5	-
1400	4	116.5	1283.5	-
1500	4	116.5	1383.5	-
1600	6	116.5	800	1483.5
1700	6	116.5	850	1583.5
1800	6	116.5	916.5	1683.5
1900	6	116.5	950	1783.5
2000	6	116.5	1016.5	1883.5
2100	6	116.5	1050	1983.5
2200	6	116.5	1116.5	2083.5
2300	6	116.5	1150	2183.5
2400	6	116.5	1216.5	2283.5
2500	6	116.5	1250	2383.5
2600	8	116.5	916.5	1833
2700	8	116.5	950	1900
2800	8	116.5	983.5	1967
2900	8	116.5	1016.5	2033
3000	8	116.5	1050	2100

Type 11				
L	Pcs.	L1	L2	L3
400	4	100	300	-
500	4	100	400	-
600	4	100	500	-
700	4	100	600	-
800	4	100	700	-
900	4	100	800	-
1000	4	100	900	-
1100	4	100	1000	-
1200	4	100	1100	-
1300	4	100	1200	-
1400	4	100	1300	-
1500	4	100	1400	-
1600	6	100	800	1500
1700	6	100	866.5	1600
1800	6	100	900	1700
1900	6	100	966.5	1800
2000	6	100	1000	1900
2100	6	100	1066.5	2000
2200	6	100	1100	2100
2300	6	100	1166.5	2200
2400	6	100	1200	2300
2500	6	100	1266.5	2400
2600	8	100	900	1800
2700	8	100	933.5	1867
2800	8	100	966.5	1933
2900	8	100	1000	2000
3000	8	100	1033.5	2067

Radiators

Assembly Dimensions & Accessories

Assembly Dimensions Type 10 - 20 - 21 - 22 - 33		
H	B	E
300	84	108
400	134	133
500	234	133
600	234	183
900	634	133

Assembly Dimensions Type 11		
H	B	E
300	84	108
400	134	133
500	234	133
600	234	183
900	634	133

Technical drawing showing radiator assembly details. Dimensions include 30-45, 100, 27.5, 78.5-93.2, and min. 100 mm. Labels include Console, G_{1/2}"x4, A, and B.

Accessories and their quantities:

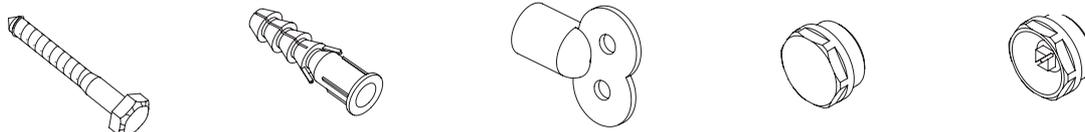
- Blind plug: G 1/2 1 pcs (into accessory package)
- Air-went plug with rotating head: Turner heading and purge cup, G 1/2 1 pcs (into accessory package)
- Screw 7x50: (into accessory package)
- Dowel 10x45: (into accessory package)

Radiator Height (mm)	A (mm)	B (mm)
300	109	84
400	159	134
500	259	234
600	259	234
900	659	634

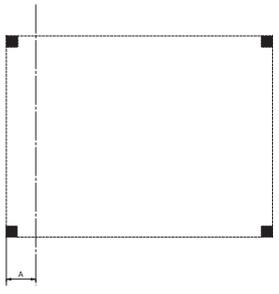
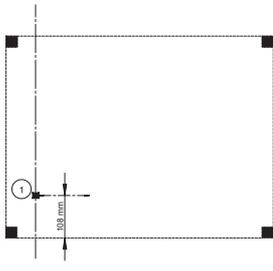
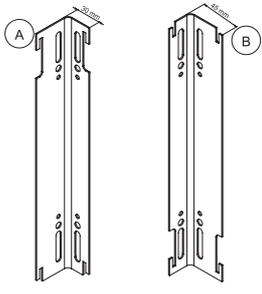
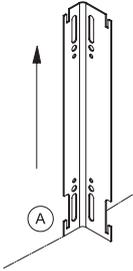
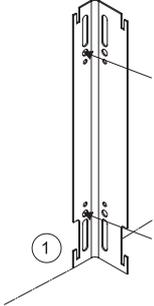
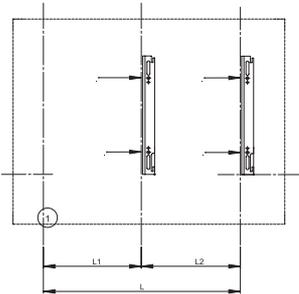
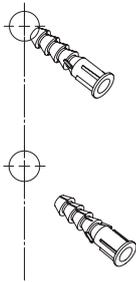
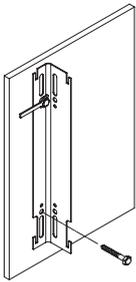
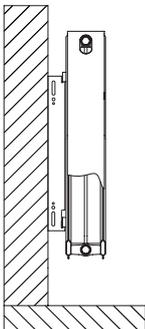
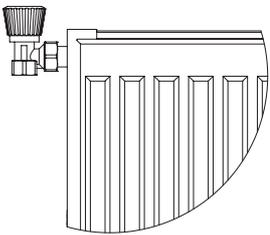
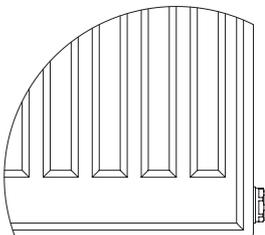
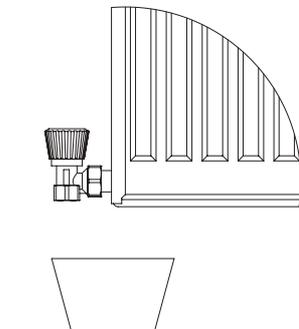
Assembly

Step 1

Carefully take out the set inside the pe package in order not to scratch the radiator. Check contents of the package. If there is any missing item, please obtain it before starting the installation.

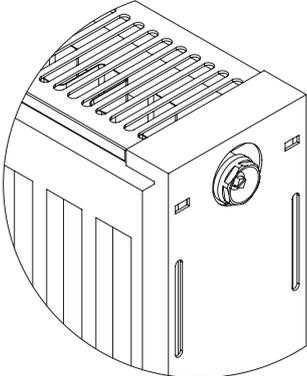
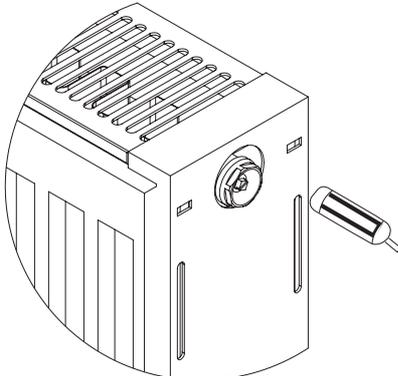
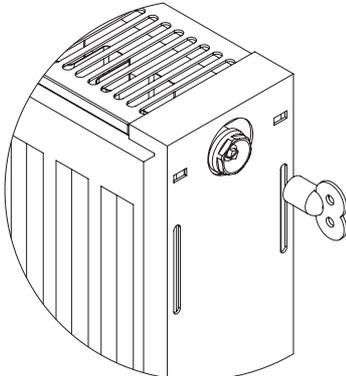


Radiators

Step 2	Step 3	Step 4	Step 5
<p>Place the inner and outer surfaces of the radiator according to the installation connections. Mark the location of the radiator on the wall leaving spaces on the bottom, top, left and right sides of the radiator. You will also need some space to install the valves both on the right and left sides of the radiator.</p>	<p>Mark the wall 107.5 mm below the bottom edge of the radiator on suspension brace clamp axis.</p>	<p>The suspension brace clamp can be mounted on the wall so that either the wide or the narrow part can be on the wall.</p>	<p>You can use the suspension brace clamp as a guide. Place lower edge to match point A showing upwards and the clamp holes to center the axis line to make it vertical to the floor. Use a water gauge during this process.</p>
			
Step 6	Step 7	Step 8	Step 9
<p>Mark the wall where the suspension brace clamps will be screwed to the wall.</p>	<p>Use the values on page 5 (L1, L2, or L3) to mark the location where the suspension brace clamp axis should be. Again use the suspension brace clamps as a template to mark the locations to be drilled in.</p>	<p>Using a suitable drill make the holes in the wall and place the dowels inside the holes.</p>	<p>Place the suspension brace clamps on the wall taking care of the position of the narrow/wide sides. Use the screws to firmly mount the first clamp to the wall. Use a water gauge to make sure that the clamps are located parallel to each other and then mount the other clamp to the wall.</p>
			
Step 10	Step 11	Step 12	Step 13
<p>Hang the radiator on the suspension brace clamps.</p>	<p>Unplug the plastic on the side (right or left) where the water is flowing. Fasten the valve to the top hole and the blind plug to the bottom hole.</p>	<p>Then unplug the other plastic on the top and replace it with the purjor plug, and fasten the valve to the bottom hole. Now, the radiator is ready to be connected to the system. You can make the connections.</p>	<p>Do not use the radiator before filling water into the system and controlling if there is any leakage.</p>
			

Radiators

Removing the Air From the Radiator

Step 1	Step 2	Step 3
<p>In order to evacuate the air from the radiator, turn the plastic part inside the air vent plug to down position.</p>	<p>Put a container pot below while evacuating the air out because water and air will both come out at the same time. Start your boiler which will also let the pump to work. With the pressure inside the radiator, air will be evacuated from the radiator.</p>	<p>Put the air vent key inside it's nest and loosen the air vent. Air flow will leave out from the air vent. When the air noise stops and only water comes out; it means that the air has been evacuated from the radiator. Tighten the air vent with the key, control the water content in the whole system, and if needed, complete the water.</p>
		

Radiator Choice Calculations

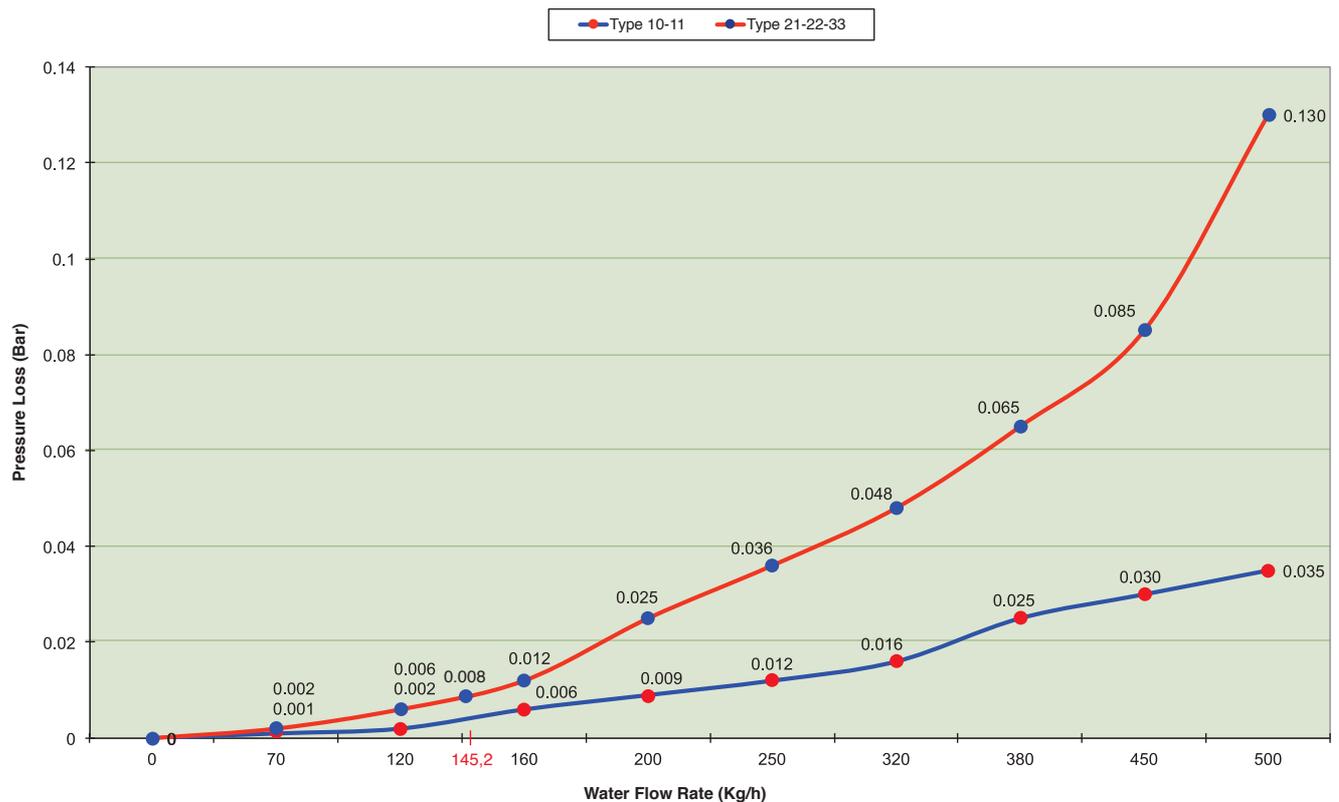
In order to get the maximum efficiency from the radiator, you should choose the appropriate one for your needs. While making your choice, you need to calculate the capacity changes according to the pressure losses, different water in and out conditions, and the room temperatures. Below you can find some samples for these choices.

Pressure Loss

Due to the friction inside the system, a pressure loss will occur. This is important for the choice of the pump. Most of the pressure loss happens inside the radiator. You can calculate the pressure loss in the radiators using the below chart.

Radiators

Pressure loss table



Example: What is the pressure loss on a 600/22DPDC/1000 radiator?

$Q_n = 1688$ watt = for one radiator of size 600/22DPDC/1000; it is 1452 kcal/h (1 watt = 0,86 kcal/h)

Water flow percentage = $Q_{rv} / (\text{water temperature in} - \text{water temperature out})$

Water flow percentage = $1452 / (75 - 65)$ Water flow percentage = 145,2 kg/h

You can use the chart to calculate the pressure loss as below.

- On type 22 line; draw a vertical line from x-axis to meet water flow
- Then draw a horizontal line from y-axis;
- Where the lines meet is the value of the pressure loss for type 22 x 600 x 1000. For this example, the value of the pressure loss is 0,008 bars.

Generally speaking, pressure loss depends on the water flow and the radiator's type and dimensions. It is more critical for longer radiators.

Capacity of the Radiators Under Different Water and Room Temperatures

Radiator temperature outputs are linear. Heat output tables show the heat output of a one-meter (length) radiator. According to the Table 1, a one meter long radiator's output is 1,200 watts, and a 70 cm long radiator's output will be 840 watts (0,70 x 1200) and 2,200 mm long radiator's output will be 2,640 watts (2,2 x 1200)

Radiator heat outputs vary depending on differences of water and room temperatures.

In Table 2, you will find the heat outputs of radiator according to 90/70, 75/65, 70/55, 55/45 °C (water in and out temperatures), and in Table 1 you will find the heat outputs of radiator according to 90/70 °C at the different room temperature. (water in and out temperatures).

If you need other heat output values you can use the F factor values on Table 3. There are two examples below.

Radiators

Example 1:

If heat output value for (75/65) 20 °C room temperature is 1808 watts, what will be the heat output for a room of 18 °C and 70/55°C In Table 3 (showing F Factor), in the first vertical column you can see the water temperature and in the second vertical column you can see the room temperature. In the horizontal column you can see the temperature of the water out from the radiator. Where these columns meet, you can find the F value. F value is 1,17 for the values of 70/55 °C and 18 °C.

New heat output value is calculated with the below formula: $Q=Q_n/F$

$$Q = 1688/1.17 = 1,443 \text{ watts}$$

Q = Needed heat output

Q_n = Standard heat output

F = Capacity factor in the Table 3

Example 2:

This calculation is used to choose a radiator for a room or a space.

Let's assume that heat needed for a room is Q=1,700 watts. How can we calculate the heat output of a radiator on 18°C and 70/55°C And how can we choose a radiator?

From Table 2, F value is 1.17

$$Q_n=Q \times F \quad Q_n=1,700 \times 1.17 \quad Q_n=1,989 \text{ watts}$$

So, we choose a radiator of Q_n=1,989 watts (according to 75/65 °C and room temperature 20 °C) we can choose these radiators: DPDC 500x1400mm or 600x1200mm.

If we do not apply this condition and choose a radiator of 1,700 watts instead of 1,989 watts, then the room temperature will never come to requested levels.

Table 1

Heat Output Table (90 °C / 70 °C) Water Temperature									
Height		500				600			
Room Temp. °C		PC	DPSC	DPDC	TPTC	PC	DPSC	DPDC	TPTC
12 °C	Watt/mts	598	868	1211	1585	717	1036	1414	1895
	Kcal/mts	514	747	1042	1363	616	891	1216	1630
15 °C	Watt/mts	642	933	1302	1704	770	1114	1519	2037
	Kcal/mts	552	802	1120	1465	663	958	1307	1752
18 °C	Watt/mts	678	985	1374	1798	813	1176	1604	2150
	Kcal/mts	583	847	1182	1546	699	1011	1379	1849
20 °C	Watt/mts	892	1296	1808	2366	1070	1547	2110	2829
	Kcal/mts	767	1114	1555	2035	920	1330	1815	2433
22 °C	Watt/mts	740	1076	1501	1964	888	1284	1751	2348
	Kcal/mts	637	925	1291	1689	764	1104	1506	2019
24 °C	Watt/mts	767	1115	1555	2035	920	1330	1815	2433
	Kcal/mts	660	959	1337	1750	791	1144	1561	2092

Radiators

Table 2

Heat Output Table (Watt)											
20°C		TYPE 11					TYPE 21				
L (mm)	t1/ t2 (°C)	H (mm)					H (mm)				
		300	400	500	600	900	300	400	500	600	900
400	90/70	227	294	357	428	609	342	433	518	619	858
	75/65	178	231	281	336	482	270	341	408	487	675
	70/55	155	201	244	293	420	235	298	356	424	587
	55/45	90	117	143	171	249	139	175	209	249	344
500	90/70	284	367	446	535	762	427	541	648	773	1073
	75/65	223	288	351	421	602	337	427	510	608	844
	70/55	194	251	305	366	526	294	372	445	530	734
	55/45	113	146	179	214	312	174	219	261	311	430
600	90/70	341	441	535	642	914	513	650	778	928	1287
	75/65	268	346	421	505	722	405	512	612	730	1012
	70/55	233	301	366	439	631	353	446	533	636	881
	55/45	136	176	215	257	374	209	263	314	373	516
700	90/70	398	514	624	749	1066	598	758	907	1083	1502
	75/65	312	403	491	589	843	472	597	714	852	1181
	70/55	271	351	428	512	736	412	521	622	742	1028
	55/45	158	205	251	300	436	244	307	366	435	602
800	90/70	455	587	713	856	1219	683	866	1037	1237	1716
	75/65	357	461	561	673	963	540	683	817	973	1350
	70/55	310	401	489	585	841	471	595	711	847	1175
	55/45	181	234	287	342	499	278	351	418	497	688
900	90/70	512	661	803	963	1371	769	975	1166	1392	1931
	75/65	401	519	631	757	1084	607	768	919	1095	1518
	70/55	349	451	550	659	946	530	670	800	953	1321
	55/45	204	263	322	385	561	313	394	471	559	774
1000	90/70	569	734	892	1070	1523	854	1083	1296	1547	2146
	75/65	446	576	701	841	1204	675	854	1021	1217	1687
	70/55	388	501	611	732	1051	588	744	889	1059	1468
	55/45	226	293	358	428	623	348	438	523	621	860
1100	90/70	625	808	981	1177	1676	940	1191	1426	1701	2360
	75/65	490	634	772	925	1325	742	939	1123	1338	1856
	70/55	427	551	672	805	1156	647	818	978	1165	1615
	55/45	249	322	394	471	686	383	482	575	684	946
1200	90/70	682	881	1070	1284	1828	1025	1299	1555	1856	2575
	75/65	535	692	842	1009	1445	809	1024	1225	1460	2025
	70/55	465	602	733	878	1261	706	893	1067	1271	1762
	55/45	271	351	430	514	748	417	526	627	746	1033
1400	90/70	796	1028	1248	1499	2132	1196	1516	1814	2165	3004
	75/65	624	807	982	1177	1686	944	1195	1429	1704	2362
	70/55	543	702	855	1024	1471	824	1042	1245	1483	2056
	55/45	317	410	502	599	872	487	613	732	870	1205
1600	90/70	910	1175	1427	1713	2437	1367	1733	2074	2475	3433
	75/65	713	922	1122	1346	1927	1079	1366	1633	1947	2700
	70/55	620	802	977	1171	1682	942	1190	1423	1695	2349
	55/45	362	468	573	685	997	557	701	836	994	1377
1800	90/70	1023	1322	1605	1927	2742	1538	1949	2333	2784	3862
	75/65	803	1037	1263	1514	2167	1214	1536	1837	2190	3037
	70/55	698	902	1099	1317	1892	1059	1339	1600	1907	2643
	55/45	407	527	645	770	1122	626	789	941	1119	1549
2000	90/70	1137	1468	1783	2141	3046	1708	2166	2592	3093	4291
	75/65	892	1153	1403	1682	2408	1349	1707	2041	2434	3374
	70/55	776	1003	1221	1463	2102	1177	1488	1778	2119	2937
	55/45	452	586	717	856	1246	696	876	1046	1243	1721

Radiators

Heat Output Table (Watt)											
20°C		TYPE 11					TYPE 21				
L (mm)	t1/ t2 (°C)	H (mm)					H (mm)				
		300	400	500	600	900	300	400	500	600	900
2200	90/70	1251	1615	1962	2355	3351	1879	2382	2851	3403	4720
	75/65	981	1268	1543	1850	2649	1484	1878	2245	2677	3712
	70/55	853	1103	1344	1610	2312	1295	1637	1956	2331	3230
	55/45	498	644	788	941	1371	765	964	1150	1367	1893
2400	90/70	1364	1762	2140	2569	3656	2050	2599	3110	3712	5149
	75/65	1070	1522	1852	2220	3179	1781	2253	2695	3212	4454
	70/55	931	1323	1612	1932	2775	1553	1964	2347	2797	3876
	55/45	543	773	946	1130	1645	918	1157	1380	1640	2272
2600	90/70	1478	1909	2318	2783	3960	2221	2815	3369	4021	5579
	75/65	1159	1498	1824	2187	3131	1754	2219	2654	3164	4387
	70/55	1008	1303	1588	1902	2733	1530	1934	2312	2754	3818
	55/45	588	761	931	1113	1620	905	1139	1359	1616	2237
2800	90/70	1592	2056	2497	2997	4265	2392	3032	3629	4331	6008
	75/65	1249	1614	1964	2355	3371	1889	2390	2858	3407	4724
	70/55	1086	1404	1710	2049	2943	1648	2083	2490	2966	4111
	55/45	633	820	1003	1198	1745	974	1227	1464	1740	2409
3000	90/70	1706	2203	2675	3211	4570	2563	3249	3888	4640	6437
	75/65	1338	1729	2104	2523	3612	2024	2561	3062	3650	5062
	70/55	1163	1504	1832	2195	3153	1765	2232	2667	3178	4405
	55/45	679	878	1075	1284	1870	1044	1315	1568	1864	2581

Heat Output Table (Watt)											
20°C		TYPE 22					TYPE 33				
L (mm)	t1/ t2 (°C)	H (mm)					H (mm)				
		300	400	500	600	900	300	400	500	600	900
400	90/70	445	569	679	820	1117	620	789	946	1132	1575
	75/65	351	448	535	644	878	489	620	743	885	1233
	70/55	306	390	466	561	763	426	539	646	768	1070
	55/45	181	229	273	328	447	252	316	377	445	621
500	90/70	556	711	849	1025	1396	774	986	1183	1415	1968
	75/65	438	560	668	806	1097	611	775	928	1107	1541
	70/55	382	488	582	701	954	533	674	807	961	1338
	55/45	226	287	342	410	559	315	395	471	557	777
600	90/70	667	853	1019	1230	1675	929	1183	1419	1697	2362
	75/65	526	672	802	967	1316	733	930	1114	1328	1850
	70/55	459	585	698	841	1145	640	809	968	1153	1606
	55/45	271	344	410	492	670	378	473	565	668	932
700	90/70	778	995	1189	1435	1954	1084	1380	1656	1980	2755
	75/65	614	784	936	1128	1536	855	1085	1300	1550	2158
	70/55	535	683	815	981	1336	746	944	1130	1345	1873
	55/45	316	401	478	574	782	440	552	659	779	1088
800	90/70	889	1137	1359	1640	2233	1239	1577	1893	2263	3149
	75/65	702	896	1069	1289	1755	978	1240	1485	1771	2466
	70/55	612	780	931	1121	1527	853	1079	1291	1537	2141
	55/45	361	459	547	656	894	503	631	753	891	1243

Radiators

Heat Output Table (Watt)											
20°C		TYPE 22					TYPE 33				
L (mm)	t1/ t2 (°C)	H (mm)					H (mm)				
		300	400	500	600	900	300	400	500	600	900
900	90/70	1000	1279	1529	1845	2512	1394	1775	2129	2546	3543
	75/65	789	1007	1203	1450	1975	1100	1395	1671	1992	2774
	70/55	688	878	1047	1261	1718	959	1213	1453	1729	2409
	55/45	406	516	615	738	1005	566	710	847	1002	1398
1000	90/70	1111	1421	1699	2050	2792	1549	1972	2366	2829	3936
	75/65	877	1119	1337	1688	2194	1222	1549	1856	2214	3083
	70/55	765	975	1164	1402	1909	1066	1348	1614	1921	2676
	55/45	452	573	683	820	1117	629	789	942	1113	1554
1100	90/70	1222	1563	1868	2255	3071	1704	2169	2602	3112	4330
	75/65	965	1231	1470	1772	2413	1344	1704	2042	2435	3391
	70/55	841	1073	1280	1542	2099	1172	1483	1775	2113	2944
	55/45	497	631	751	902	1229	692	868	1036	1225	1709
1200	90/70	1334	1706	2038	2460	3350	1859	2366	2839	3395	4724
	75/65	1052	1343	1604	1933	2633	1467	1859	2228	2656	3699
	70/55	918	1170	1397	1682	2290	1279	1618	1937	2305	3211
	55/45	542	688	820	984	1340	755	947	1130	1336	1864
1400	90/70	1556	1990	2378	2870	3908	2168	2760	3312	3961	5511
	75/65	1228	1567	1871	2256	3072	1711	2169	2599	3099	4316
	70/55	1070	1365	1629	1962	2672	1492	1888	2260	2690	3747
	55/45	632	803	956	1148	1564	881	1105	1318	1559	2175
1600	90/70	1778	2274	2718	3280	4466	2478	3155	3785	4527	6298
	75/65	1403	1791	2139	2578	3510	1955	2479	2970	3542	4932
	70/55	1223	1560	1862	2243	3054	1705	2157	2582	3074	4282
	55/45	722	917	1093	1312	1787	1007	1262	1507	1781	2486
1800	90/70	2000	2558	3057	3690	5025	2788	3549	4258	5092	7086
	75/65	1578	2015	2406	2900	3949	2200	2789	3342	3984	5549
	70/55	1376	1755	2095	2523	3435	1919	2427	2905	3458	4817
	55/45	813	1032	1230	1477	2011	1133	1420	1695	2004	2797
2000	90/70	2223	2843	3397	4100	5583	3098	3943	4731	5658	7873
	75/65	1754	2239	2674	3222	4388	2444	3099	3713	4427	6165
	70/55	1529	1950	2328	2803	3817	2132	2697	3228	3842	5352
	55/45	903	1147	1366	1641	2234	1259	1578	1883	2226	3107
2200	90/70	2445	3127	3737	4510	6141	3408	4338	5204	6224	8660
	75/65	1929	2463	2941	3544	4827	2689	3409	4084	4870	6782
	70/55	1682	2145	2560	3084	4199	2345	2966	3551	4226	5887
	55/45	993	1261	1503	1805	2458	1384	1736	2071	2449	3418
2400	90/70	2667	3411	4077	4920	6700	3717	4732	5678	6790	9447
	75/65	2315	2955	3529	4253	5792	3226	4091	4901	5844	8138
	70/55	2019	2574	3072	3700	5039	2814	3560	4261	5072	7065
	55/45	1192	1514	1803	2166	2949	1661	2083	2486	2939	4102
2600	90/70	2889	3696	4416	5330	7258	4027	5126	6151	7356	10235
	75/65	2280	2911	3476	4189	5704	3177	4029	4827	5755	8015
	70/55	1988	2535	3026	3644	4962	2771	3506	4196	4995	6958
	55/45	1174	1491	1776	2133	2904	1636	2052	2448	2894	4039
2800	90/70	3112	3980	4756	5740	7816	4337	5521	6624	7921	11022
	75/65	2455	3134	3743	4511	6143	3422	4339	5198	6198	8631
	70/55	2141	2730	3259	3925	5344	2985	3775	4519	5379	7493
	55/45	1264	1605	1913	2297	3128	1762	2209	2636	3117	4350
3000	90/70	3334	4264	5096	6150	8375	4647	5915	7097	8487	11809
	75/65	2631	3358	4010	4833	6582	3666	4648	5569	6641	9248
	70/55	2294	2925	3491	4205	5726	3198	4045	4842	5763	8028
	55/45	1355	1720	2049	2461	3351	1888	2367	2825	3340	4661

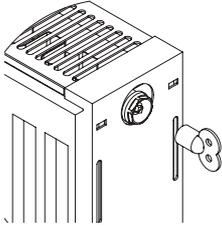
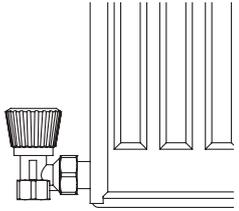
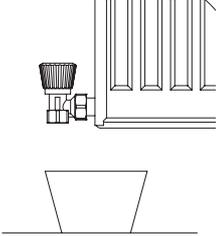
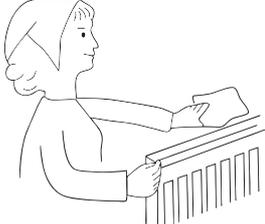
Radiators

Table 3

F Factor Table								
Entrance Water Temp. t1 (°C)	Exit Water Temp. t2 (°C)	F Factor Values						
		10 (°C)	12 (°C)	15 (°C)	18 (°C)	20 (°C)	22 (°C)	24 (°C)
95	80	0.57	0.59	0.62	0.65	0.68	0.70	0.73
	70	0.62	0.65	0.68	0.73	0.76	0.79	0.83
	60	0.69	0.72	0.77	0.83	0.87	0.91	0.96
	50	0.79	0.83	0.89	0.96	1.02	1.08	1.15
90	80	0.59	0.61	0.64	0.68	0.71	0.74	0.77
	75	0.62	0.64	0.68	0.72	0.75	0.78	0.82
	70	0.65	0.67	0.72	0.76	0.80	0.83	0.87
	65	0.68	0.71	0.76	0.81	0.85	0.89	0.93
	60	0.72	0.76	0.81	0.87	0.91	0.96	1.01
	55	0.77	0.81	0.87	0.93	0.98	1.04	1.10
	50	0.83	0.87	0.93	1.01	1.07	1.14	1.21
85	75	0.64	0.67	0.71	0.75	0.79	0.82	0.86
	70	0.68	0.70	0.75	0.80	0.84	0.88	0.92
	65	0.72	0.75	0.80	0.85	0.89	0.94	0.99
	60	0.76	0.79	0.85	0.91	0.96	1.01	1.07
	55	0.81	0.85	0.91	0.98	1.04	1.10	1.16
80	70	0.71	0.74	0.79	0.84	0.88	0.93	0.97
	65	0.75	0.78	0.84	0.90	0.94	0.99	1.05
	60	0.80	0.83	0.89	0.96	1.01	1.07	1.13
	55	0.85	0.89	0.96	1.04	1.10	1.16	1.24
	50	0.91	0.96	1.04	1.13	1.20	1.28	1.37
75	65	0.79	0.82	0.88	0.95	1.00	1.05	1.12
	60	0.84	0.88	0.94	1.02	1.08	1.14	1.21
	55	0.89	0.94	1.01	1.10	1.17	1.24	1.32
	50	0.96	1.01	1.10	1.20	1.28	1.37	1.47
	60	0.88	0.93	1.00	1.08	1.15	1.22	1.30
70	55	0.94	0.99	1.08	1.17	1.25	1.33	1.42
	50	1.01	1.07	1.17	1.28	1.37	1.47	1.58
	45	1.10	1.16	1.28	1.42	1.52	1.64	1.79
	55	1.00	1.05	1.15	1.26	1.34	1.43	1.54
65	50	1.08	1.14	1.25	1.37	1.47	1.59	1.71
	45	1.17	1.24	1.37	1.52	1.64	1.78	1.94
	40	1.28	1.37	0.52	1.71	1.87	2.05	2.27
	55	1.07	1.13	1.23	1.36	1.45	1.56	1.68
60	50	1.15	1.22	1.34	1.48	1.60	1.73	1.87
	45	1.25	1.33	1.47	1.65	1.78	1.94	2.13
	40	1.37	1.47	1.64	1.86	2.03	2.24	2.50
	50	1.23	1.31	1.45	1.62	1.75	1.90	2.07
55	45	1.34	1.43	1.60	1.80	1.96	2.15	2.37
	40	1.47	1.59	1.78	2.03	2.24	2.48	2.78
	35	1.64	1.78	2.03	2.36	2.64	2.99	3.43
	45	1.45	1.56	1.75	1.98	2.17	2.40	2.67
50	40	1.6	1.73	1.96	2.25	2.50	2.79	3.15
	35	1.78	1.94	2.24	2.63	2.96	3.38	3.92
	30	2.03	2.24	2.64	3.20	3.70	4.39	5.39
	40	1.75	1.90	2.17	2.53	2.83	3.19	3.66
45	35	1.96	2.15	2.50	2.96	3.37	3.89	4.58
	30	2.24	2.48	2.96	3.63	4.25	5.11	6.38
	35	2.17	2.40	2.83	3.41	3.93	4.62	5.54
40	30	2.50	2.79	3.37	4.21	5.01	6.14	7.87

Radiators

Pay Attention to the Following for an Appropriate Operation

1.	<h3>ACCURATE CHOOSING</h3>	<p>In order to get the maximum efficiency from the radiator, you need to choose the appropriate one and place it in a suitable location. Here, we give the necessary criteria, graphics and tables to help choosing the appropriate radiator. We explain the necessary precautions for the location of the radiator as well. Please examine these parts before choosing a radiator.</p>
2.		<p>In order to let the radiator to work and with high efficiency, you should take out the jammed air from the radiator.</p>
3.	<h3>PMA 10 BAR</h3>	<p>Maximum operational working pressure is 10 bars. You should not apply more than 10 bars operationally.</p>
4.		<p>Please install valves at the water entrance and exit of the radiator. This way, if there is a problem in the radiator, you can easily take the radiator out of the circulation system.</p>
5.		<p>Even if you do not use the radiator for a long time, please do not evacuate the water from the radiator. During system maintenance, close the valves in order to leave the water inside the radiator. Otherwise, corrosion will start inside the radiator which will harm the whole system. If there is any leakage in the radiator or in the connection points, it should be repaired immediately.</p>
6.	<h3>0°C</h3>	<p>Do not install the radiator externally where freezing danger is available. The radiator's installation environment temperature should not be less than 0°C. Frozen water inside the radiator might harm both the radiator and the whole system. If the radiator environment temperature is below 0°C; then please add anti-freeze to the water inside the system.</p>
7.	<h3>120°C</h3>	<p>Maximum operational working temperature of a radiator is 120 °C. You should not use the radiator above this temperature.</p>
8.		<p>Do not use any chemicals to wipe and clean the surfaces of the radiators. You can use moisty cloth to clean the surface of the radiator.</p>

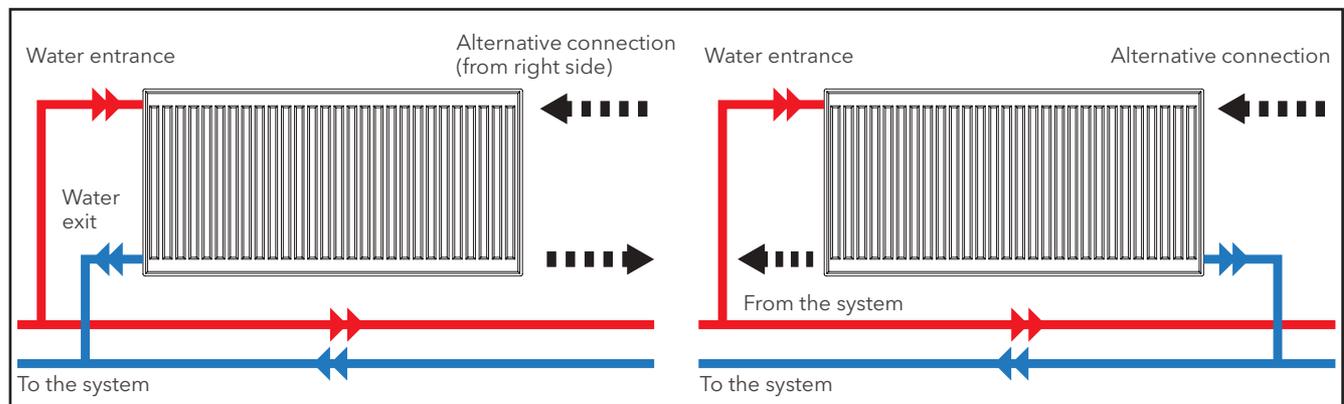
Radiators

Installation Suggestions

You can install the radiator to the system depending on the location and features of the radiator. We propose to use water entrance valve and water exit valve. This will allow you to separate the radiator from the system without emptying the water or when the system is operating. Information on the radiator connection shape and efficiency is below.

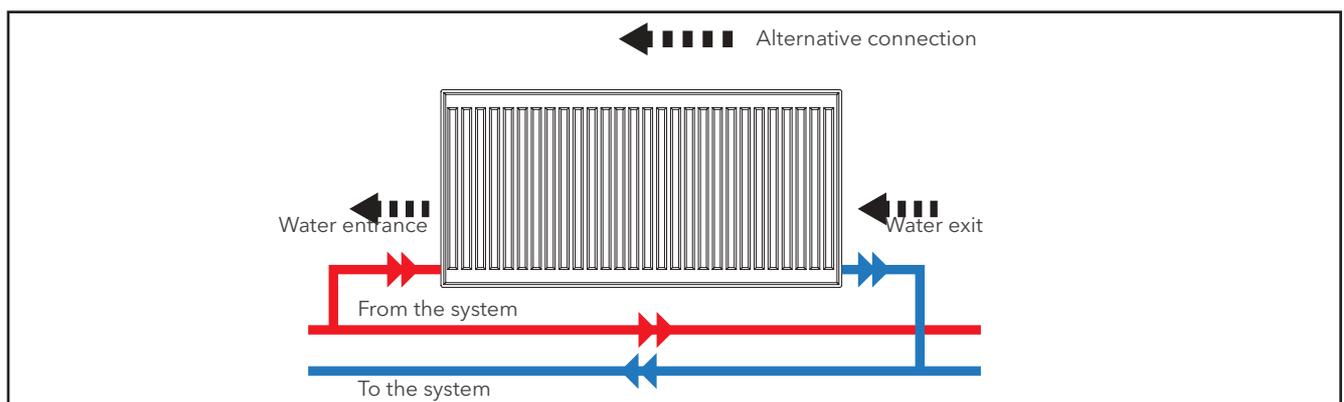
1. Hot water entrance from the top and exit from below:

Water entrance and exit can be from the same sides or opposite sides. Entrance or exit can be done both from right or left sides. This commonly used feature enables assembly according to the connections. Connection from the same side or other side effects the efficiency of the radiator due to change of water flow. Our experiments indicate the efficiency does not change much in different heights and different lengths even up to 3,000 mm. Hence, with our radiators, you can connect using both sides since there is almost no efficiency change.



2. Water entrance and exit from below:

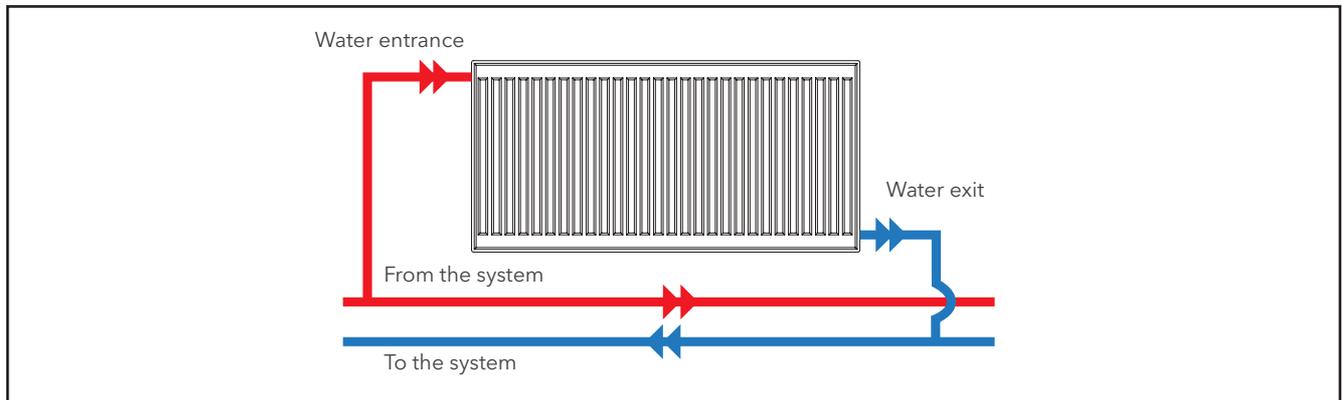
Although not preferred, when connecting from above is not possible, you can make the connections from below. When the entrance connection is made from the top, the water is spread evenly on the radiator body and leave the radiator from the bottom connection which leaves a homogenous distribution of heat on the surface. But when both connections are made from below, some water flows directly to the exit and some goes up and falls down and mixes up with the water flowing. Therefore the efficiency is 10 to 20% lower on radiators where both connections are made from below. Entrance and exit can be changed when conditions change.



Radiators

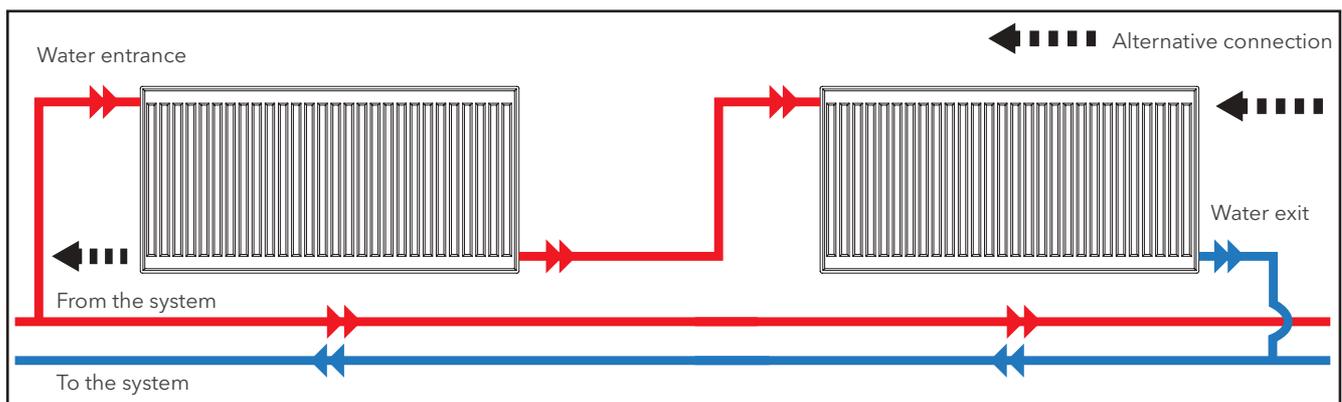
3. Connection to single pipe system:

In this type of connection as the heat is reduced by discharged chilled water from a radiator due to mixing with hot water, the heat in each radiator will be different. For an efficient heating the pipe diameter is very important. The radiator inlet pipe should be chosen larger than the plumbing pipe. The radiator outlet pipe should be chosen smaller than the plumbing pipe for complete circulation of water. In addition, to ensure the water supply, the adjustment of radiator valves and the flow rate should be done, while the flow rate of the first radiator is reduced towards the end radiators the flow should be increased.



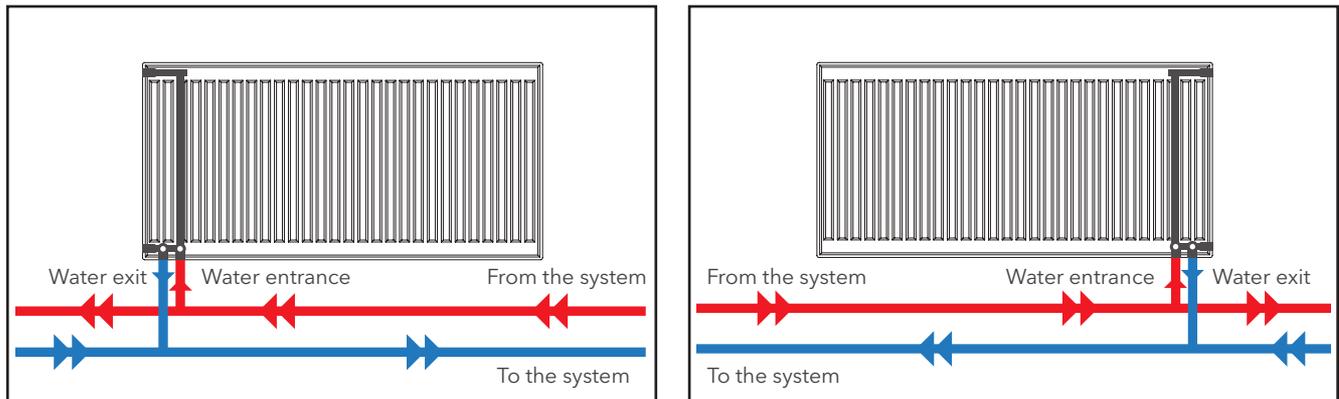
4. Connection of the serial (side by side) radiators:

This kind of connection is used in very rare conditions where, due to the construction features, the wall is divided by the columns. In this connection, water exit of the radiator goes to water entrance of the other radiator. Therefore, heat output of each radiator changes. Water entrance and exit can be done from the same or different sides. When different sides are used, radiators connected serially have a total heat output that is a little bit less than when the radiators (same quantity) are connected individually. When the same sides are used for entrance and exit, then radiators connected serially give a total heat output that is 8 to 10 % less than when the radiators (same quantity) are connected individually. During implementation, the first choice should be preferred. Otherwise, please take care of the efficiency loss in the other option. Depending on the circulation pump, total heat output load should not be more than 7,000-8,000 Kcal/hour.



Radiators

5. Compact valve radiator connections:

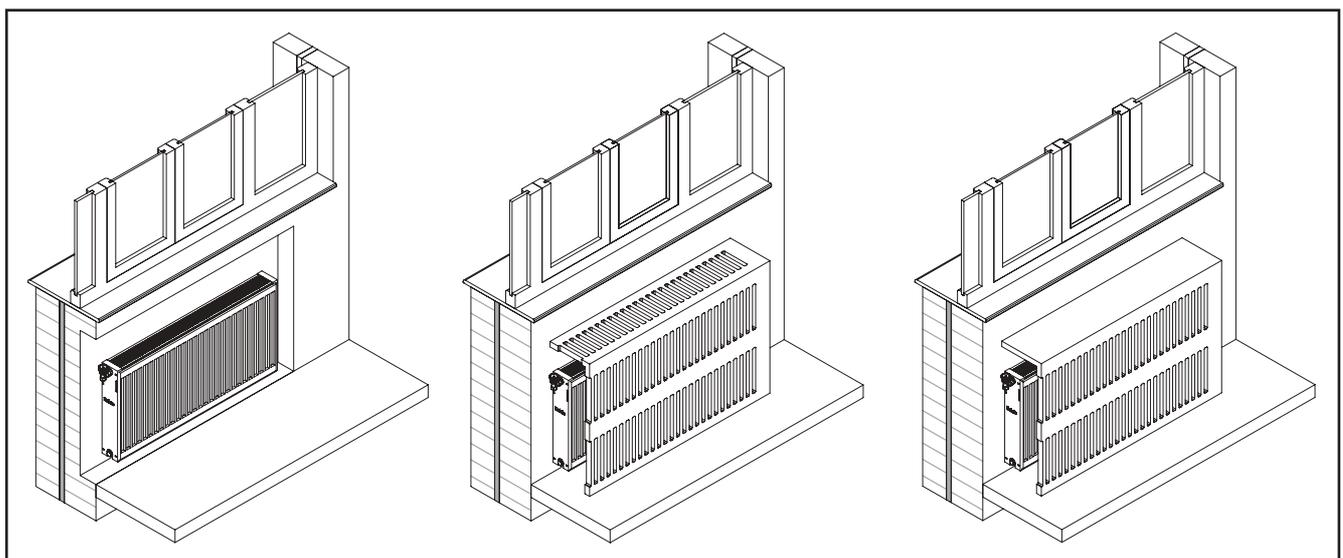


Points to Get Maximum Comfort During the Placement of the Radiator

In some rooms there can be indentation below the window where the radiator is to be located. In this case, the radiator should be placed inside this indentation. In some environments, the radiator is covered with wooden furniture for aesthetic reasons. However, it is better not to cover the top and other sides of the radiator for more efficiency. TS 1499 and TS 2164/2 publications show how the efficiency of the radiator is effected negatively based on the location of the radiator. To increase efficiency, one should pay attention to the below points.

If the top of the radiator is covered; heated air will pass through to the room before reaching the window. Hence, window and the glasses will stay cold. In this case, the cold air flow will effect the environment temperature.

If top cover is essential, then use a grilled cover to leave some gap for air circulation.



Radiators

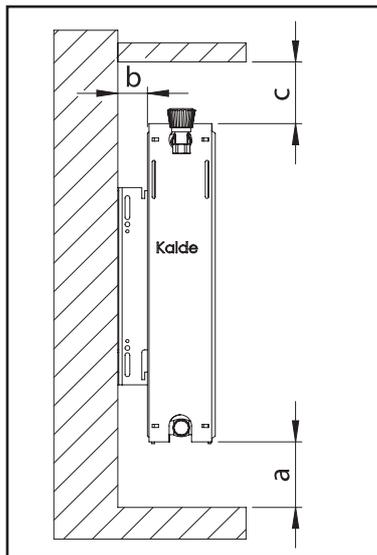
Radiator Efficiency Calculation

Example 1

Radiator Type: 22 DPDC
Height = 600 mm
Length = 1,000 mm
Location: a = 100 mm b = 40 mm c = 80 mm

Find the efficiency of the radiator on Table 4 plan location no. 4 = 90 %

Room Temperature: 20 °C
Water entrance Exit Temperature: 90/70 °C
On Table 1 Heat output = 2110 watts
Capacity = Nominal capacity x efficiency
= 2110 x 0,90 = 1900 watt

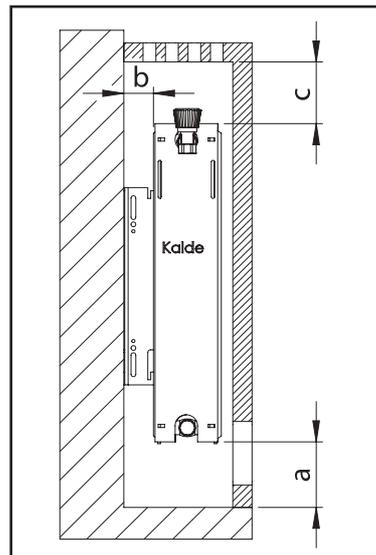


Example 2

Height = 600 mm
Length = 1,000 mm.
Location: b = 40 mm, c = 80 mm, d = 104 mm.

Find the efficiency of the radiator on Table 5 plan location no. 4 = 105 %

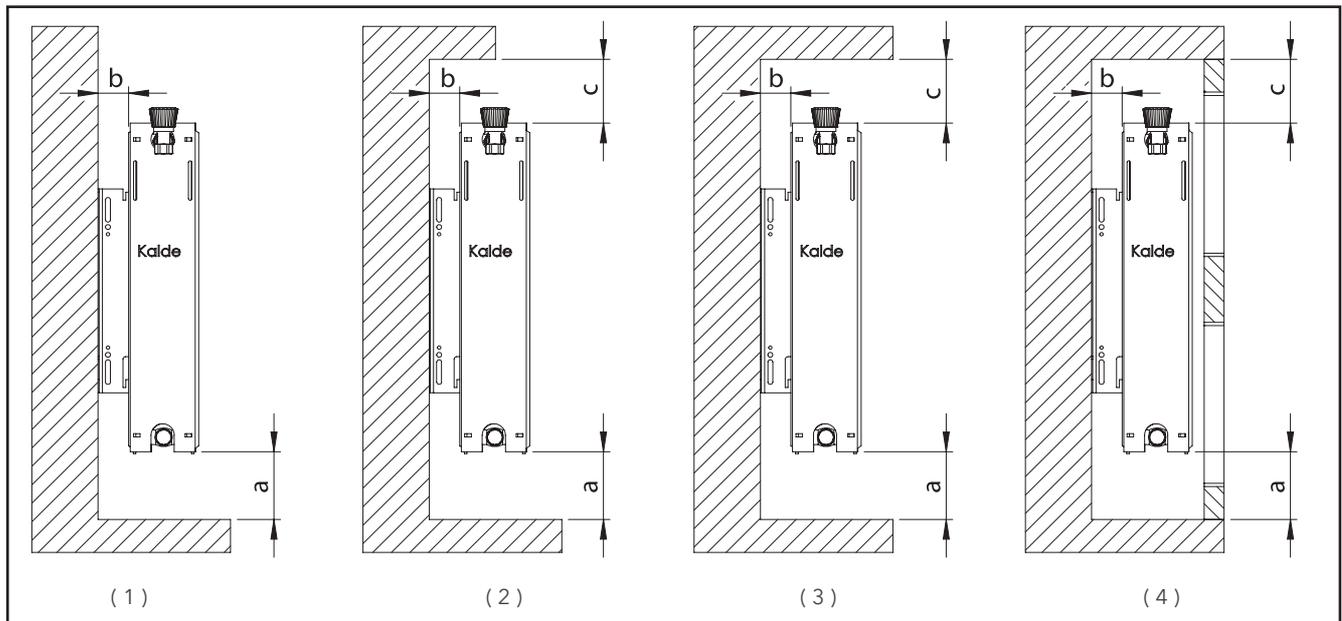
Room Temperature = 20 °C
Water entrance Exit Temperature = 90/70 °C
On Table 5 a = 0,70 x d = 0.70 x 104 = 73,5 mm
Heat output = 2110 watts
Capacity = Nominal capacity x efficiency
= 2110 x 1.05 = 2215 watt



Radiators

Points to Take Care During Mounting In Order to Get Maximum Efficiency:

If the surrounding and top part are covered, the efficiency of the radiator goes down when air flow is banned. In this case the choice of the radiator should be done according to efficiency loss. Ideal position of a radiator as indicated in TS 2164/2- is that where the top and surrounding are not covered and it is placed 40 mm away from the wall and 100 mm above the floor.

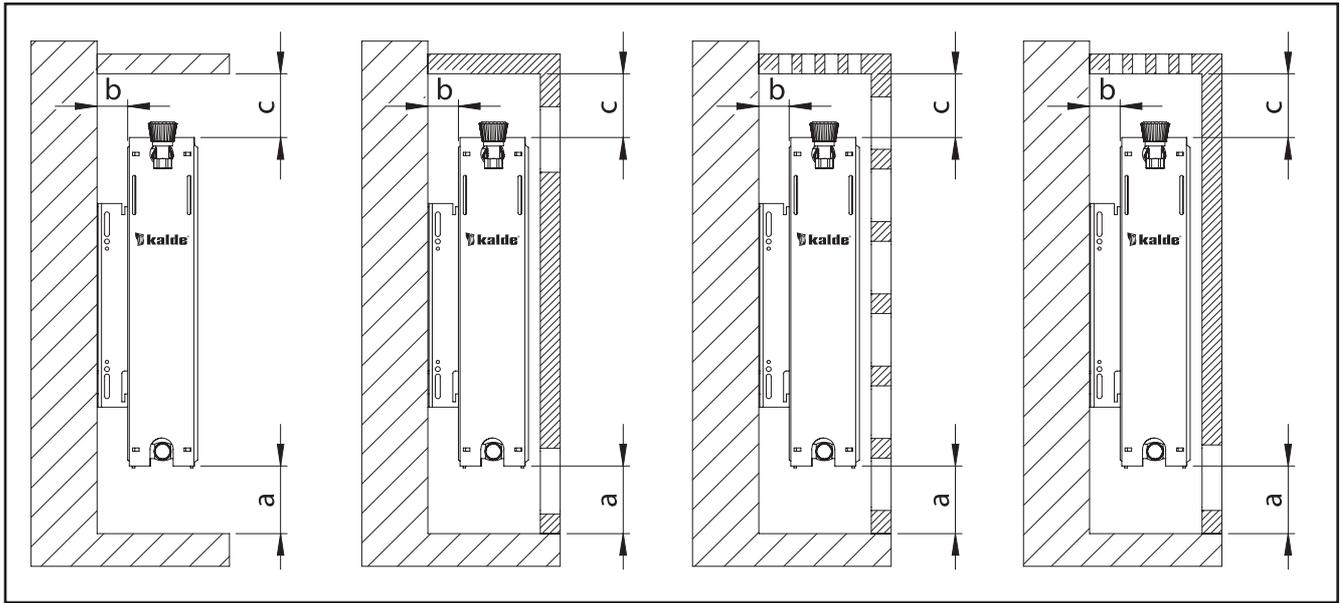


R The base width of the window also effects the distribution of the air flow inside the room. The base of the window should fully, at least partially, the top of the radiator.

Table 4

Dimensions (mm)	a (min)	100	100	100	100
	b (min)	40	40	40	40
	c	-	80	80	80
Efficiency (%)		100	96	90	75

Radiators



The efficiency changes depending on how the radiator is covered can be seen from the figure.

Table 5

Dimensions (mm)	a (min)	100		100		100	$a=0.70 d$
	b (min)	40		40		40	40
	c	100	50	100	50	80	80
Efficiency (%)		97	95	90	85	90	105

Points to Take Into Consideration And Warranty Conditions

- 1- Our Warranty does not apply for the following problems and defects:
 - Incorrectly located radiators; incorrect pipe connections; incorrect capacity and type choice; more than 5 bars installation pressure; incorrectly designed and made installation; physical (impacts, cracks, scratches) and chemical changes made after the sales; any problems that may be born from loading, unloading, transportation, or storage conditions; damage from fire or thunderbolt or flood, or other natural disasters; freezing due to climate conditions; any system which does not comply with the installation instructions indicated in our manual; using electric plugs without earthing; any problem or damage born from faulty electrical installation
 - Destruction on the certificate, and acts against the instructions stated in the instruction manual and related problems and damages caused because of these reasons
 - Scratches on painted surfaces, impacts and related problems caused by these defects
 - If you can not submit a Warranty Certificate together with an invoice of your purchase
 - Any damages resulting from not regularly maintaining and checking the product
 - Use of unauthorized personnel for radiators with damages or defects
 - Damages caused by the components and boilers connected to the radiator and installation
- 2- Please fill in the warranty certificate while purchasing our product, and have it stamped from the dealer. Please keep your invoice and warranty certificate together.
- 3- Please follow the instructions in the instruction manual given with the product while using the product.
- 4- Please consult to your dealer or our company for any problems.
- 5- The warranty begins with the sales date on the warranty card. As to benefit from warranty you should inform your distributor about the defect immediately as it occurs and you should follow your distributor's instructions. Warranty conditions are as per warranty certification of the seller.
- 6- During the assembly, if the fittings are tightened to the radiator too firmly, leakages may occur. Do not tighten the fittings to the radiator too firmly.
- 7- After the assembly, fittings should be free from dust and sawdust. If necessary, please clean the surfaces of the fittings before the installation test.
- 8- Please control the connection points of the system during the water transmission. The pressure of the transmission should comply with the operational pressure of the system.
- 9- Radiators should be protected against impacts and scratches during transportation. Scratches and impacts on the surface of the radiator can result in problems not covered by our warranty
- 10- Please use moisty cloth while cleaning the surface of your radiator. Do not use any chemical substances or a completely wet cloth for cleaning.
- 11- There can be air inside the radiator after the installation or during the operation of the system. This will prevent the radiator from working efficiently. Use the purjor key to evacuate the air.
- 12- Never evacuate the water inside your radiator. In time, changing the radiator water might cause corrosion inside. If you do not use your radiator for a long time, in order not to lose water out of your radiator, please tighten the valves.
- 13- Please do not install the radiator externally where freezing danger is available. The radiator's installation environment temperature should not be less than 0°C. Frozen water inside the radiator might harm both the radiator and the whole system. If the radiator environment temperature is below 0°C, then add anti-freeze to the water inside the system.
- 14- Maximum operational working temperature of a radiator is 120 °C. You should not use the radiator above this temperature.
- 15- Please use only water for the circulation inside your radiator. Do not use any other liquid substances otherwise stated.
- 16- You should not use your radiator in acidic environments and environments containing chemical substances. Such environments might cause corrosion on surface paint and steel surface of the radiator.
- 17- Do not dry, wet clothing or any wet dresses on the radiator surface. Do not use the surfaces for heating food or a tea pot. Radiators have been designed as devices to transmit the heat which is circulating inside.
- 18- Do not cover the surface and top of the radiators. Leave enough space for air circulation. Do not cover the radiator with furniture, cabinet, cloth, or marble since you can not get maximum efficiency from the radiator.
- 19- If water circulating inside the system is hard or acidic, use anti-corrosives (oxygen removing agent or PH organizer for aborting hardness) in your system.
- 20- Panel radiator should be used in closed circuit systems. Never use them in open circuit systems (steam, thermal, boiling water, or network water system).
- 21- Panel radiators should not be installed in humid environments (swimming pool, sauna, parks, winter gardens, closed areas where the humidity is very high).
- 22- Panel radiators should not be used in environments exposed to acids, or environments with low PH values (pickles factory or canned food factory), or near seas with salty conditions. They should not be exposed to breeze of salty conditions, to acid rain, or to acidic climate and places.
- 23- Our products should be installed according to standards accepted by EN 442; otherwise, the warranty is not valid.
- 24- Any urgent necessary repairs should be carried out by the authorised services of the distributor. The approval of the distributor is compulsory.
- 25- A leakage test at maximum 5 Atu should be applied to radiators and to its components after installation completed properly. Before starting up the system, it should be cleaned from every kind of dust and dirt.
- 26- The water installation systems are subject to a 24 hours testing period before taking in use as indicated in Kalde catalogs. (Please keep the test reports for any requirements)

Radiators

Type 22 / H 300

Code	Size	Pcs.
0322-rad-300400	300 x 400	1
0322-rad-300500	300 x 500	1
0322-rad-300600	300 x 600	1
0322-rad-300700	300 x 700	1
0322-rad-300800	300 x 800	1
0322-rad-300900	300 x 900	1
0322-rad-301000	300 x 1000	1
0322-rad-301100	300 x 1100	1
0322-rad-301200	300 x 1200	1
0322-rad-301300	300 x 1300	1
0322-rad-301400	300 x 1400	1
0322-rad-301500	300 x 1500	1
0322-rad-301600	300 x 1600	1
0322-rad-301700	300 x 1700	1
0322-rad-301800	300 x 1800	1
0322-rad-301900	300 x 1900	1
0322-rad-302000	300 x 2000	1
0322-rad-302100	300 x 2100	1
0322-rad-302200	300 x 2200	1
0322-rad-302300	300 x 2300	1
0322-rad-302400	300 x 2400	1
0322-rad-302500	300 x 2500	1
0322-rad-302600	300 x 2600	1
0322-rad-302700	300 x 2700	1
0322-rad-302800	300 x 2800	1
0322-rad-302900	300 x 2900	1
0322-rad-303000	300 x 3000	1



Radiators

Type 22 / H 400

Code	Size	Pcs.
0322-rad-400400	400 x 400	1
0322-rad-400500	400 x 500	1
0322-rad-400600	400 x 600	1
0322-rad-400700	400 x 700	1
0322-rad-400800	400 x 800	1
0322-rad-400900	400 x 900	1
0322-rad-401000	400 x 1000	1
0322-rad-401100	400 x 1100	1
0322-rad-401200	400 x 1200	1
0322-rad-401300	400 x 1300	1
0322-rad-401400	400 x 1400	1
0322-rad-401500	400 x 1500	1
0322-rad-401600	400 x 1600	1
0322-rad-401700	400 x 1700	1
0322-rad-401800	400 x 1800	1
0322-rad-401900	400 x 1900	1
0322-rad-402000	400 x 2000	1
0322-rad-402100	400 x 2100	1
0322-rad-402200	400 x 2200	1
0322-rad-402300	400 x 2300	1
0322-rad-402400	400 x 2400	1
0322-rad-402500	400 x 2500	1
0322-rad-402600	400 x 2600	1
0322-rad-402700	400 x 2700	1
0322-rad-402800	400 x 2800	1
0322-rad-402900	400 x 2900	1
0322-rad-403000	400 x 3000	1



* Sipariş üzerine üretilmektedir.

Radiators

Type 22 / H 500

Code	Size	Pcs.
0322-rad-500400	500 x 400	1
0322-rad-500500	500 x 500	1
0322-rad-500600	500 x 600	1
0322-rad-500700	500 x 700	1
0322-rad-500800	500 x 800	1
0322-rad-500900	500 x 900	1
0322-rad-501000	500 x 1000	1
0322-rad-501100	500 x 1100	1
0322-rad-501200	500 x 1200	1
0322-rad-501300	500 x 1300	1
0322-rad-501400	500 x 1400	1
0322-rad-501500	500 x 1500	1
0322-rad-501600	500 x 1600	1
0322-rad-501700	500 x 1700	1
0322-rad-501800	500 x 1800	1
0322-rad-501900	500 x 1900	1
0322-rad-502000	500 x 2000	1
0322-rad-502100	500 x 2100	1
0322-rad-502200	500 x 2200	1
0322-rad-502300	500 x 2300	1
0322-rad-502400	500 x 2400	1
0322-rad-502500	500 x 2500	1
0322-rad-502600	500 x 2600	1
0322-rad-502700	500 x 2700	1
0322-rad-502800	500 x 2800	1
0322-rad-502900	500 x 2900	1
0322-rad-503000	500 x 3000	1



Radiators

Type 22 / H 600

Code	Size	Pcs.
0322-rad-600400	600 x 400	1
0322-rad-600500	600 x 500	1
0322-rad-600600	600 x 600	1
0322-rad-600700	600 x 700	1
0322-rad-600800	600 x 800	1
0322-rad-600900	600 x 900	1
0322-rad-601000	600 x 1000	1
0322-rad-601100	600 x 1100	1
0322-rad-601200	600 x 1200	1
0322-rad-601300	600 x 1300	1
0322-rad-601400	600 x 1400	1
0322-rad-601500	600 x 1500	1
0322-rad-601600	600 x 1600	1
0322-rad-601700	600 x 1700	1
0322-rad-601800	600 x 1800	1
0322-rad-601900	600 x 1900	1
0322-rad-602000	600 x 2000	1
0322-rad-602100	600 x 2100	1
0322-rad-602200	600 x 2200	1
0322-rad-602300	600 x 2300	1
0322-rad-602400	600 x 2400	1
0322-rad-602500	600 x 2500	1
0322-rad-602600	600 x 2600	1
0322-rad-602700	600 x 2700	1
0322-rad-602800	600 x 2800	1
0322-rad-602900	600 x 2900	1
0322-rad-603000	600 x 3000	1



Radiators

Type 22 / H 900

Code	Size	Pcs.
0322-rad-900400	900 x 400	1
0322-rad-900500	900 x 500	1
0322-rad-900600	900 x 600	1
0322-rad-900700	900 x 700	1
0322-rad-900800	900 x 800	1
0322-rad-900900	900 x 900	1
0322-rad-901000	900 x 1000	1
0322-rad-901100	900 x 1100	1
0322-rad-901200	900 x 1200	1
0322-rad-901300	900 x 1300	1
0322-rad-901400	900 x 1400	1
0322-rad-901500	900 x 1500	1
0322-rad-901600	900 x 1600	1
0322-rad-901700	900 x 1700	1
0322-rad-901800	900 x 1800	1
0322-rad-901900	900 x 1900	1
0322-rad-902000	900 x 2000	1
0322-rad-902100	900 x 2100	1
0322-rad-902200	900 x 2200	1
0322-rad-902300	900 x 2300	1
0322-rad-902400	900 x 2400	1
0322-rad-902500	900 x 2500	1
0322-rad-902600	900 x 2600	1
0322-rad-902700	900 x 2700	1
0322-rad-902800	900 x 2800	1
0322-rad-902900	900 x 2900	1
0322-rad-903000	900 x 3000	1



