

VIADRUS

SUMMARY OF TECHNICAL INFORMATION
FOR DESIGNING
THE CAST-IRON HEATING BODIES

Kalor / Kalor 3 / Termo

Bohemia / Bohemia R

Styl / Hellas

ALUMINIUM HEATING BODIES

Residence

BIMETALLIC HEATING BODIES

Duostar



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CAST-IRON HEATING BODIES

KALOR

KALOR

DESCRIPTION

Heating body consisting of sections connected into heating systems using steel nipples with external right-hand or left-hand thread G 5/4" is manufactured in eight models:

350/160 mm, 500/70 mm, 500/110 mm, 500/160 mm, 500/220 mm, 600/160 mm, 900/70 mm, 900/160 mm.

Heating bodies comply with EN 442 – 1 amendment A1. The material used is a grey cast-iron corresponding to EN 1561. The design of castings ensures a long life cycle of products.

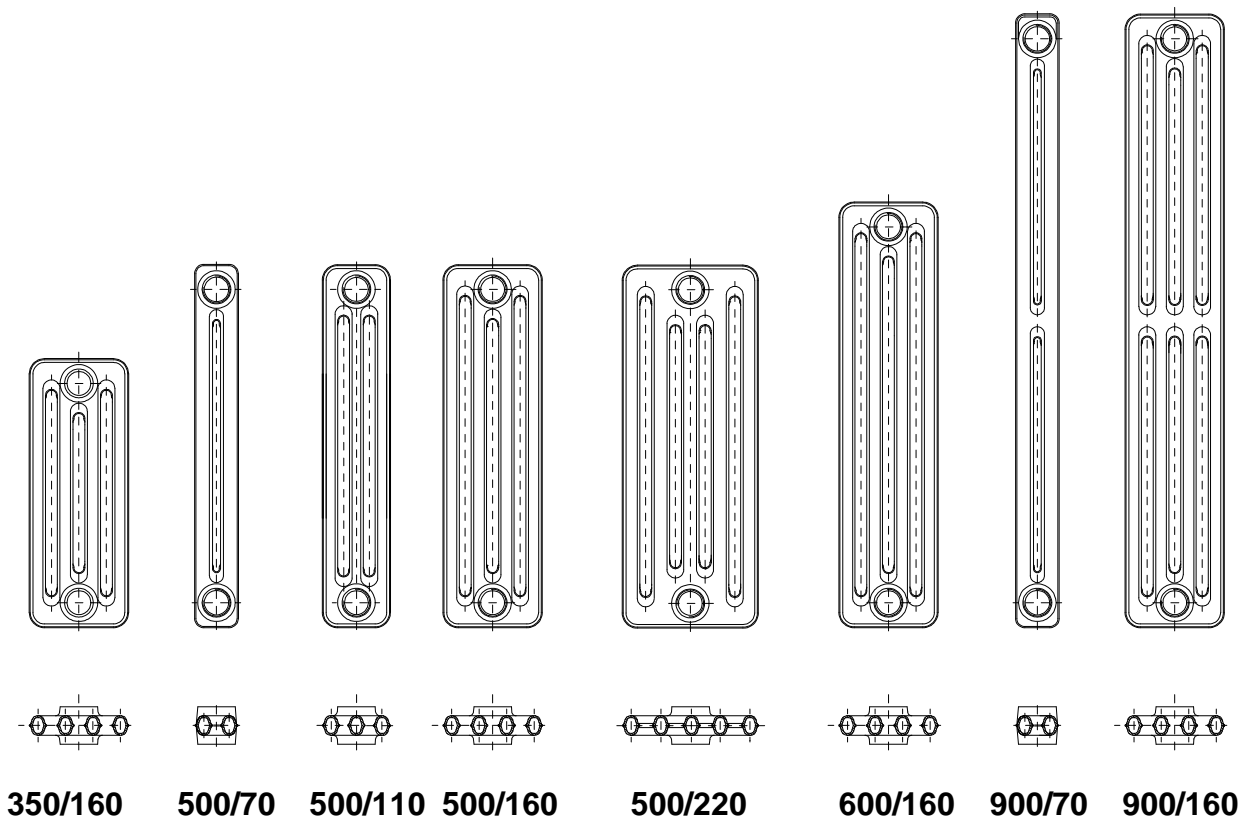


Fig. 1 Kalor line heating bodies

USAGE

All heating bodies of Kalor line are designed for warm-water central heating systems with gravity and forced circulation of heating water with the highest operating temperature not exceeding 115 °C and **highest operating overpressure of up to 0.6 MPa**. In addition to this all models manufactured are approved for steam central heating systems with the maximum operating overpressure of up to 0.07 MPa.

THERMAL AND TECHNICAL PARAMETERS

Table 1 Significant thermal and technical parameters of Kalor heating sections

Property	Symbol	Unit	350/160	500/70	500/110	500/160	500/220	600/160	900/70	900/160
Identification number			1	3	5	7	9	11	13	15
Total height	H	(mm)	430	580	580	580	580	680	980	980
Spacing	h	(mm)	350	500	500	500	500	600	900	900
Depth	B	(mm)	160	70	110	160	220	160	70	160
Width	L	(mm)	60	60	60	60	60	60	60	60
Connection thread	G	"	5/4	5/4	5/4	5/4	5/4	5/4	5/4	5/4
Weight	M	(kg/section)	4,30	3,20	4,00	5,60	6,95	6,60	5,20	10,60
Equivalent heating area	S _L	(m ² /section)	0,185	0,120	0,180	0,255	0,345	0,306	0,205	0,440
Water volume	V	(dm ³ /section)	0,8	0,5	0,8	1,1	1,3	1,2	0,8	1,5
Thermal power	Q _{Tn}	(W/section)	70	53	73	94	120	110	89	152
Thermal module	Q _M	(W/m)	1162	889	1162	1516	1979	1815	1370	2475
Temperature exponent	n	(-)	1,250	1,240	1,250	1,250	1,285	1,270	1,280	1,310

All Kalor models are certified by SZÚ Brno. Thermal and technical parameters are verified experimentally in compliance with EN 442_1 amendment A1

Tables 2 through to 33 provide values of thermal power for individual models of cast-iron heating bodies for number of sections ranging from 2 up to 30, variable required air temperature and temperature gradient of the heat-transfer fluid (water) equal to 90/70 °C, 75/65 °C, 55/45 °C and steam.

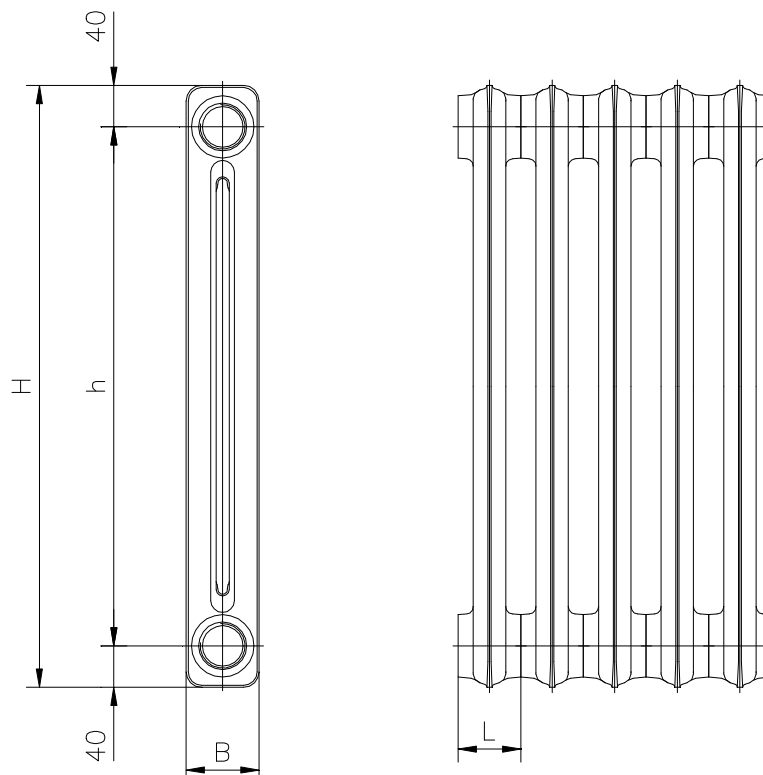


Fig. 2 Standard dimensions of Kalor sections

Basic thermal and technical parameters for the heat-transfer fluid – **water** – with the **temperature gradient of 75/65 °C** and one-sided lateral connection (supply) of the heat-transfer fluid (water) at the top are provided in Table 1. Individual models of heating bodies are measured without cover.

TESTING OVERPRESSURE

Units manufactured are subject to the pressure test performed in manufacturer's facility using overpressure of cold water equal to 1 MPa.

ASSEMBLY

In order to achieve required thermal power of heating bodies it is necessary to maintain the installation position indicated on Fig. 3. In addition to this **a minimum overlap of the window sill** shall be adhered to.

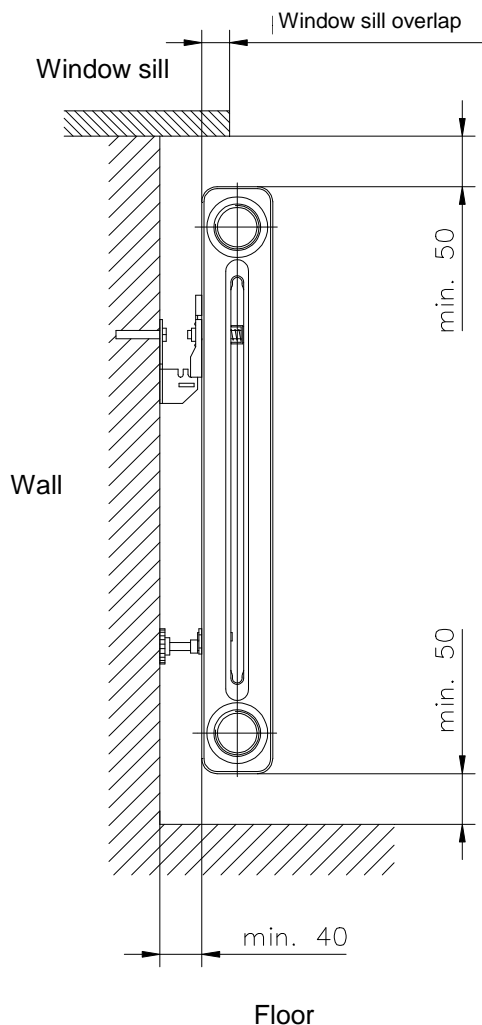


Fig. 3 Installation of Kolor heating bodies

Kolor heating bodies are connected to the distribution piping using roses provided with external right-hand or left hand thread G 5/4" with G 1/8", G 1/4", G 3/8", G 1/2", G 3/4" and G 1" **bores (warning: don't use hemp as sealing under these rosettes).**

Openings of the heating body on the opposite side to the inlet and outlet connections of the heat-transfer fluid (water) are usually terminated by plugs provided with external right-hand or left-hand thread G 5/4". The upper plug can be provided with a bore with eccentrically positioned thread G 3/8" or G 1/4" for the air relief valve. Automatic air relief valves are suitable for this purpose. Prior to combining the individual units supplied into the heating body of required size it is necessary to perform a thorough cleaning of contact surfaces of sections and individual connections shall be sealed by Clingerite, which is normally used during production and it is suitable both for warm-water and steam systems. The sections shall be coupled with the torque of min. 130 Nm and max. 150 Nm. by means of steel nipples.

Gyroscopic moment for tightening of rosettes is from 130 Nm to 150 Nm.

Other installation data are provided in the section of instruction manual common for all models of heating bodies manufactured.

THERMAL POWER TABLES FOR INDIVIDUAL MODELS OF HEATING BODIES

WARM-WATER HEATING

Temperature gradient to EN 442 – 2

Temperature gradients 90/70 °C
 75/65 °C
 55/45 °C

Table 2
Thermal power of heating bodies Kalor 350/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90\text{ °C}$

$t_{w2} = 70\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	237	215	201	193	184	176
3	345	312	293	280	268	255
4	453	410	384	368	351	335
5	561	507	476	455	435	415
6	668	605	567	543	519	495
7	776	702	659	630	602	574
8	884	800	750	718	686	654
9	992	897	842	806	770	734
10	1100	995	934	893	853	814
11	1207	1093	1025	981	937	894
12	1315	1190	1117	1068	1021	973
13	1543	1288	1208	1156	1104	1053
14	1531	1385	1300	1243	1188	1133
15	1639	1483	1391	1331	1272	1213
16	1746	1580	1483	1419	1355	1393
17	1854	1678	1574	1506	1439	1372
18	1962	1775	1666	1594	1522	1452
19	2070	1873	1757	1681	1606	1532
20	2178	1970	1849	1769	1690	1612
21	2285	2068	1940	1856	1773	1691
22	2393	2166	2032	1944	1857	1771
23	2501	2263	2123	2032	1941	1851
24	2609	2361	2215	2119	2024	1931
25	2717	2458	2306	2207	2108	2011
26	2824	2556	2398	2294	2192	2090
27	2932	2653	2489	2382	2275	2170
28	3040	2751	2581	2469	2359	2250
29	3148	2848	2673	2557	2443	2330
30	3256	2946	2764	2644	2526	2410

Table 3
Thermal power of heating bodies Kalor 350/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	193	171	159	151	143	135
3	280	249	231	219	207	196
4	368	327	303	288	272	257
5	455	405	375	356	337	318
6	543	483	448	425	402	379
7	630	561	520	493	467	441
8	718	639	592	562	531	502
9	806	716	664	630	596	563
10	893	794	736	698	661	624
11	981	872	809	767	726	685
12	1068	950	881	835	791	747
13	1156	1028	953	904	856	808
14	1243	1106	1025	972	920	869
15	1331	1184	1097	1041	985	930
16	1419	1262	1170	1109	1050	991
17	1506	1339	1242	1178	1115	1053
18	1594	1417	1314	1246	1180	1114
19	1681	1495	1386	1315	1244	1175
20	1769	1573	1458	1383	1309	1236
21	1856	1651	1531	1452	1374	1297
22	1944	1729	1603	1520	1439	1359
23	2032	1807	1675	1589	1504	1420
24	2119	1884	1747	1657	1568	1481
25	2207	1962	1819	1726	1633	1542
26	2294	2040	1892	1794	1698	1603
27	2382	2118	1964	1863	1763	1665
28	2469	2196	2036	1931	1828	1726
29	2557	2274	2108	2000	1892	1787
30	2644	2352	2180	2068	1957	1848

Table 4
Thermal power of heating bodies Kalor 350/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55 \text{ }^{\circ}\text{C}$

$t_{w2} = 45 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	111	93	83	76	69	62
3	162	135	120	110	100	91
4	213	178	158	144	132	119
5	264	220	195	179	163	147
6	314	262	233	213	194	176
7	365	305	270	248	226	204
8	416	347	308	282	257	232
9	466	389	345	316	288	261
10	517	432	383	351	320	289
11	568	474	420	385	351	318
12	618	516	458	420	382	346
13	669	559	495	454	414	374
14	720	601	533	488	445	403
15	770	643	570	523	476	431
16	821	686	608	557	508	459
17	872	728	645	591	539	488
18	922	770	683	626	570	516
19	973	813	720	660	602	544
20	1024	855	758	695	633	573
21	1075	897	795	729	664	601
22	1125	940	833	763	696	629
23	1176	982	870	798	727	658
24	1227	1024	908	832	758	686
25	1277	1067	945	867	790	714
26	1328	1109	983	901	821	743
27	1379	1151	1020	935	852	771
28	1429	1194	1058	970	884	800
29	1480	1236	1095	1004	915	828
30	1531	1278	1133	1038	946	856

Table 5
Thermal power of heating bodies Kalor 500/70 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90 \text{ }^\circ\text{C}$

$t_{w2} = 70 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	196	178	167	160	153	146
3	276	250	235	225	215	206
4	355	322	303	290	277	265
5	434	394	370	355	339	324
6	514	466	438	420	401	383
7	593	538	506	484	463	443
8	672	610	573	549	525	502
9	752	682	641	614	587	561
10	831	754	709	679	650	620
11	910	826	777	744	712	680
12	990	898	844	809	774	739
13	1069	970	912	874	836	798
14	1149	1042	980	938	898	857
15	1228	1114	1047	1003	960	917
16	1307	1186	1115	1068	1022	976
17	1387	1258	1183	1133	1084	1035
18	1466	1330	1250	1198	1146	1094
19	1545	1402	1318	1263	1208	1153
20	1625	1474	1386	1328	1270	1213
21	1704	1546	1454	1392	1332	1272
22	1784	1618	1521	1457	1394	1331
23	1863	1690	1589	1522	1456	1390
24	1942	1762	1657	1587	1518	1450
25	2022	1835	1724	1652	1580	1509
26	2101	1907	1792	1717	1642	1568
27	2180	1979	1860	1781	1704	1627
28	2260	2051	1927	1846	1766	1687
29	2339	2123	1995	1911	1828	1746
30	2419	2195	2063	1976	1890	1805

Table 6
Thermal power of heating bodies Kalor 500/70 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75 \text{ }^{\circ}\text{C}$

$t_{w2} = 65 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	160	143	133	126	120	113
3	225	201	187	177	168	159
4	290	259	240	228	216	205
5	355	317	294	279	265	250
6	420	374	348	330	313	296
7	484	432	402	381	362	342
8	549	490	455	433	410	388
9	614	548	509	484	458	434
10	679	606	563	535	507	479
11	744	664	617	586	555	525
12	809	722	670	637	604	571
13	874	779	724	688	652	617
14	938	837	778	739	700	662
15	1003	895	832	790	749	708
16	1068	953	885	841	797	754
17	1133	1011	939	892	846	800
18	1198	1069	993	943	894	845
19	1263	1127	1047	994	942	891
20	1328	1184	1100	1045	991	937
21	1392	1242	1154	1096	1039	983
22	1457	1300	1208	1147	1088	1029
23	1522	1358	1262	1198	1136	1074
24	1587	1416	1315	1250	1184	1120
25	1652	1474	1369	1301	1233	1166
26	1717	1532	1423	1352	1281	1212
27	1781	1589	1477	1403	1330	1257
28	1846	1647	1530	1454	1378	1303
29	1911	1705	1584	1505	1426	1349
30	1976	1763	1638	1556	1474	1395

Table 7
Thermal power of heating bodies Kalor 500/70 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55 \text{ }^{\circ}\text{C}$

$t_{w2} = 45 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	94	79	70	65	59	54
3	132	111	99	91	83	75
4	170	143	127	117	107	97
5	209	175	156	143	131	119
6	247	207	184	169	155	140
7	285	239	213	195	178	162
8	323	271	241	221	202	184
9	361	303	269	248	226	205
10	399	335	298	274	250	227
11	437	367	326	300	274	249
12	475	399	355	326	298	270
13	513	431	383	352	322	292
14	551	463	412	378	346	314
15	590	495	440	404	369	335
16	628	527	469	430	393	357
17	666	559	497	457	417	379
18	704	591	525	483	441	400
19	742	623	554	509	465	422
20	780	655	582	535	489	444
21	818	687	611	561	513	465
22	856	719	639	587	537	487
23	894	751	668	613	560	509
24	933	783	696	640	584	530
25	971	815	725	666	608	552
26	1009	847	753	692	632	574
27	1047	797	781	718	653	595
28	1085	911	810	744	680	617
29	1123	943	838	770	704	639
30	1161	975	867	796	728	660

Table 8
Thermal power of heating bodies Kalor 500/110 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90 \text{ }^\circ\text{C}$

$t_{w2} = 70 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	245	222	209	200	191	182
3	357	324	304	291	278	265
4	469	425	399	382	365	348
5	580	526	494	473	452	431
6	692	627	589	564	539	514
7	803	728	684	654	626	597
8	915	829	779	745	712	680
9	1027	930	874	836	799	763
10	1138	1031	968	927	886	846
11	1250	1132	1063	1018	973	929
12	1361	1234	1158	1109	1060	1012
13	1473	1335	1253	1200	1147	1095
14	1585	1436	1348	1291	1234	1178
15	1696	1537	1443	1382	1321	1260
16	1808	1638	1538	1473	1408	1343
17	1919	1739	1633	1563	1494	1426
18	2031	1840	1728	1654	1581	1509
19	2143	1941	1823	1745	1668	1592
20	2254	2042	1918	1836	1755	1675
21	2366	2144	2013	1927	1842	1758
22	2477	2245	2108	2018	1929	1841
23	2589	2346	2203	2109	2016	1924
24	2700	2447	2298	2200	2103	2007
25	2812	2548	2393	2291	2190	2090
26	2924	2649	2488	2381	2276	2173
27	3035	2750	2583	2472	2363	2256
28	3147	2851	2678	2563	2450	2338
29	3258	2952	2773	2654	2537	2421
30	3370	3054	2867	2745	2624	2504

Table 9**Thermal power of heating bodies Kalor 500/110 depending on required air temperature and number of sections****Warm-water heating** $t_{w1} = 75 \text{ }^{\circ}\text{C}$ $t_{w2} = 65 \text{ }^{\circ}\text{C}$ *Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)*

No of sections (n)	10	15	18	20	22	24
2	200	178	165	157	149	140
3	291	259	240	228	216	204
4	382	340	316	300	284	268
5	473	421	391	371	351	332
6	564	502	466	442	419	396
7	654	583	541	513	486	460
8	745	664	616	585	557	523
9	836	745	691	656	621	587
10	927	826	766	727	689	651
11	1018	907	842	799	757	715
12	1109	988	917	870	824	779
13	1200	1069	992	941	892	843
14	1291	1150	1067	1013	959	906
15	1382	1231	1142	1084	1027	970
16	1473	1312	1217	1155	1094	1034
17	1563	1392	1292	1227	1162	1098
18	1654	1473	1367	1298	1229	1162
19	1745	1554	1443	1369	1297	1225
20	1836	1635	1518	1441	1364	1289
21	1927	1716	1593	1512	1432	1353
22	2018	1797	1668	1583	1500	1417
23	2109	1878	1743	1655	1567	1481
24	2200	1959	1818	1726	1635	1545
25	2291	2040	1893	1797	1702	1608
26	2381	2121	1969	1868	1770	1672
27	2472	2202	2044	1940	1837	1736
28	2563	2283	2119	2011	1905	1800
29	2654	2364	2194	2082	1972	1865
30	2745	2445	2269	2154	2040	1928

Table 10
Thermal power of heating bodies Kalor 500/110 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55\text{ °C}$

$t_{w2} = 45\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	117	98	87	80	73	66
3	170	142	126	116	106	96
4	223	186	165	152	138	125
5	276	231	205	188	171	155
6	329	275	244	224	204	185
7	382	319	284	260	237	215
8	435	364	323	296	270	245
9	499	408	362	332	303	275
10	541	453	402	369	336	305
11	594	497	441	405	369	335
12	647	541	480	441	402	364
13	700	586	520	477	435	394
14	753	630	559	513	468	424
15	806	574	599	549	501	454
16	859	719	638	585	534	484
17	912	763	677	622	567	514
18	965	808	717	658	600	544
19	1018	852	756	694	633	574
20	1071	896	796	730	666	603
21	1124	941	835	766	699	633
22	1177	985	874	802	732	663
23	1229	1029	914	838	765	693
24	1282	1074	953	875	798	723
25	1335	1118	992	911	831	753
26	1388	1162	1032	947	864	783
27	1441	1207	1071	983	897	813
28	1494	1551	1111	1019	930	842
29	1547	1296	1150	1055	963	872
30	1600	1340	1189	1091	996	902

Table 11**Thermal power of heating bodies Kalor 500/160 depending on required air temperature and number of sections****Warm-water heating** **$t_{w1} = 90\text{ °C}$** **$t_{w2} = 70\text{ °C}$** ***Thermal power Q (W) at air temperature of t_i (°C)***

No of sections (n)	10	15	18	20	22	24
2	325	294	275	263	250	239
3	473	427	400	382	364	347
4	621	560	525	501	478	455
5	769	694	650	621	592	564
6	917	827	775	740	706	672
7	1065	961	900	859	820	781
8	1213	1094	1025	979	934	889
9	1361	1228	1149	1098	1047	998
10	1509	1361	1274	1218	1161	1106
11	1657	1495	1399	1337	1275	1214
12	1805	1628	1524	1456	1389	1323
13	1953	1761	1649	1576	1503	1431
14	2101	1895	1774	1695	1617	1540
15	2249	2028	1899	1814	1731	1648
16	2397	2162	2024	1934	1845	1757
17	2545	2295	2149	2053	1958	1865
18	2693	2429	2274	2172	2072	1973
19	2841	2562	2399	2292	2186	2082
20	2989	2696	2524	2411	2300	2190
21	3137	2829	2649	2531	2414	2299
22	3285	2962	2774	2650	2528	2407
23	3432	3096	2899	2769	2642	2516
24	3580	3229	3024	2889	2755	2624
25	3728	3363	3149	3008	2869	2732
26	3876	3496	3273	3127	2983	2841
27	4024	3630	3398	3247	3097	2949
28	4172	3763	3523	3366	3211	3058
29	4320	3897	2648	3485	3325	3166
30	4468	4030	3773	3605	3439	3275

Table 12
Thermal power of heating bodies Kalor 500/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	263	233	215	204	192	181
3	382	338	313	296	280	264
4	501	444	411	389	367	346
5	621	550	509	481	455	429
6	740	656	606	574	542	511
7	859	761	704	667	630	594
8	979	867	802	759	717	676
9	1098	973	900	852	805	758
10	1218	1079	997	944	892	841
11	1337	1184	1095	1037	980	923
12	1456	1290	1193	1130	1067	1006
13	1576	1396	1291	1222	1155	1088
14	1695	1502	1389	1315	1242	1171
15	1814	1607	1486	1407	1330	1253
16	1934	1713	1584	1500	1417	1336
17	2053	1819	1682	1593	1505	1417
18	2172	1924	1780	1685	1592	1500
19	2292	2030	1878	1778	1680	1583
20	2411	2136	1975	1870	1767	1665
21	2531	2242	2073	1963	1855	1748
22	2650	2347	2171	2056	1942	1830
23	2769	2453	2269	2148	2029	1913
24	2889	2559	2367	2241	2117	1995
25	3008	2665	2464	2333	2204	2078
26	3127	2770	2562	2426	2292	2160
27	3247	2876	2660	2519	2379	2242
28	3366	2982	2758	2611	2467	2325
29	3485	3088	2856	2704	2554	2407
30	3605	3193	2953	2796	2642	2490

Table 13**Thermal power of heating bodies Kalor 500/160 depending on required air temperature and number of sections****Warm-water heating** **$t_{w1} = 55\text{ °C}$** **$t_{w2} = 45\text{ °C}$** ***Thermal power Q (W) at air temperature of t_i (°C)***

No of sections (n)	10	15	18	20	22	24
2	149	124	109	100	91	82
3	217	180	159	145	132	119
4	285	237	209	191	173	156
5	353	293	259	236	215	194
6	421	349	308	282	256	231
7	489	406	358	327	297	268
8	556	462	408	373	339	305
9	624	518	458	418	380	343
10	692	575	507	464	421	380
11	760	631	557	509	462	417
12	828	687	607	555	504	454
13	896	744	656	600	545	492
14	964	800	706	645	586	529
15	1031	856	756	691	628	566
16	1099	913	806	736	669	603
17	1167	969	855	782	710	641
18	1235	1025	905	827	752	678
19	1303	1082	955	873	793	715
20	1371	1138	1005	918	834	752
21	1439	1194	1054	964	875	790
22	1506	1251	1104	1009	917	827
23	1574	1307	1154	1055	958	864
24	1642	1364	1204	1100	999	901
25	1710	1420	1253	1146	1041	939
26	1778	1476	1303	1191	1082	976
27	1846	1533	1353	1236	1123	1013
28	1914	1589	1402	1282	1164	1050
29	1982	1645	1452	1327	1206	1087
30	2049	1702	1502	1373	1247	1125

Table 14**Thermal power of heating bodies Kalor 500/220 depending on required air temperature and number of sections****Warm-water heating** **$t_{w1} = 90\text{ °C}$** **$t_{w2} = 70\text{ °C}$** ***Thermal power Q (W) at air temperature of t_i (°C)***

No of sections (n)	10	15	18	20	22	24
2	447	404	379	363	346	330
3	628	568	532	509	486	464
4	809	731	686	656	626	597
5	898	895	839	803	766	731
6	1170	1058	993	949	907	864
7	1351	1222	1146	1096	1047	998
8	1532	1385	1299	1243	1187	1132
9	1713	1549	1453	1389	1327	1265
10	1894	1712	1606	1536	1467	1399
11	2075	1876	1759	1683	1607	1532
12	2255	2040	1913	1829	1747	1666
13	2436	2203	2066	1976	1887	1799
14	2617	2367	2220	2123	2027	1933
15	2798	2530	2373	2270	2167	2067
16	2979	2694	2526	2416	2308	2200
17	3160	2857	2680	2563	2448	2334
18	3341	3021	2833	2710	2588	2467
19	3521	3184	2986	2856	2728	2601
20	3702	3348	3140	3003	2868	2734
21	3883	3511	3293	3150	3008	2868
22	4064	3675	3447	3296	3148	3002
23	4245	3838	3600	3443	3288	3135
24	4426	4002	3753	3590	3428	3269
25	4607	4166	3907	3737	3568	3402
26	4787	4329	4060	3883	3709	3536
27	4968	4493	4213	4030	3849	3670
28	5149	4656	4367	4177	3989	3803
29	5330	4820	4520	4323	4129	3937
30	5511	4983	4674	4470	4269	4070

Table 15
Thermal power of heating bodies Kalor 500/220 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	363	322	298	283	268	253
3	509	452	419	398	376	355
4	656	583	540	512	484	457
5	803	713	661	627	593	560
6	949	844	782	741	701	662
7	1096	974	902	856	809	764
8	1243	1104	1023	970	918	866
9	1389	1235	1144	1085	1026	969
10	1536	1365	1265	1199	1135	1071
11	1683	1495	1386	1314	1243	1173
12	1829	1626	1506	1428	1351	1275
13	1976	1756	1627	1543	1460	1378
14	2123	1886	1748	1657	1568	1480
15	2270	2017	1869	1772	1676	1582
16	2416	2147	1990	1886	1785	1684
17	2563	2277	2110	2001	1893	1787
18	2710	2408	2231	2115	2001	1889
19	2856	2538	2352	2230	2110	1991
20	3003	2668	2473	2344	2218	2093
21	3150	2799	2593	2459	2326	2196
22	3296	2929	2714	2574	2435	2298
23	3443	3059	2835	2688	2543	2400
24	3590	3190	2956	2803	2651	2503
25	3737	3320	3077	2917	2760	2605
26	3883	3450	3197	3032	2868	2707
27	4030	3581	3318	3146	2976	2809
28	4177	3711	3439	3261	3085	2912
29	4323	3842	3560	3375	3193	3014
30	4470	3972	3681	3490	3302	3116

Table 16**Thermal power of heating bodies Kalor 500/220 depending on required air temperature and number of sections****Warm-water heating** **$t_{w1} = 55 \text{ }^\circ\text{C}$** **$t_{w2} = 45 \text{ }^\circ\text{C}$** ***Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)***

No of sections (n)	10	15	18	20	22	24
2	209	174	154	141	129	116
3	294	245	217	199	181	164
4	378	316	279	256	233	211
5	463	386	342	313	285	258
6	547	457	404	370	337	305
7	632	527	467	428	389	352
8	717	598	529	485	441	399
9	801	668	592	542	494	446
10	886	739	654	599	546	493
11	970	809	717	657	598	541
12	1055	880	779	714	650	588
13	1139	951	842	771	702	635
14	1224	1021	904	828	754	682
15	1309	1092	967	885	806	729
16	1393	1162	1029	943	858	776
17	1478	1233	1092	1000	911	823
18	1562	1303	1154	1057	963	870
19	1647	1374	1216	1114	1015	918
20	1732	1444	1279	1172	1067	965
21	1816	1515	1341	1229	1119	1012
22	1901	1586	1404	1286	1171	1059
23	1985	1656	1466	1343	1223	1106
24	2070	1727	1529	1401	1275	1153
25	2155	1797	1591	1458	1327	1200
26	2239	1868	1654	1515	1380	1247
27	2324	1938	1716	1572	1432	1295
28	2408	2009	1779	1630	1484	1342
29	2493	2079	1841	1687	1536	1389
30	2577	2150	1904	1744	1588	1436

Table 17**Thermal power of heating bodies Kalor 600/160 depending on required air temperature and number of sections****Warm-water heating** **$t_{w1} = 90\text{ °C}$** **$t_{w2} = 70\text{ °C}$** ***Thermal power Q (W) at air temperature of t_i (°C)***

No of sections (n)	10	15	18	20	22	24
2	405	367	345	330	316	301
3	569	516	484	464	444	423
4	732	664	624	597	571	545
5	896	813	763	731	699	667
6	1060	961	903	865	827	789
7	1224	1110	1043	998	955	911
8	1388	1258	1182	1132	1082	1033
9	1551	1407	1322	1266	1210	1155
10	1715	1555	1461	1399	1338	1277
11	1879	1704	1601	1533	1466	1399
12	2043	1852	1740	1667	1594	1521
13	2207	2001	1880	1800	1721	1643
14	2370	2149	2019	1934	1849	1765
15	2534	2298	2159	2067	1977	1887
16	2698	2447	2298	2201	2105	2009
17	2862	2595	2438	2335	2232	2131
18	3026	2744	2578	2468	2360	2253
19	3189	2892	2717	2602	2488	2375
20	3553	3041	2857	2736	2616	2497
21	3517	3189	2996	2869	2744	2619
22	3681	3338	3136	3003	2871	2741
23	3845	3486	3275	3137	2999	2863
24	4009	3635	3415	3270	3127	2985
25	4172	3783	3554	3404	3255	3107
26	4336	3932	3694	3537	3383	3229
27	4500	4080	3834	3671	3510	3351
28	4664	4229	3973	3805	3638	3473
29	4828	4377	4113	3938	3766	3595
30	4991	4526	4252	4072	3894	3717

Table 18

Thermal power of heating bodies Kalor 600/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	330	294	273	260	246	232
3	464	414	384	365	345	327
4	597	533	495	470	445	421
5	731	652	605	575	575	515
6	865	771	716	680	644	609
7	998	890	826	785	744	703
8	1132	1009	937	890	843	797
9	1266	1128	1048	995	943	891
10	1399	1247	1158	1100	1042	985
11	1533	1367	1269	1205	1142	1079
12	1667	1486	1380	1310	1241	1173
13	1800	1605	1490	1415	1341	1267
14	1934	1724	1601	1520	1440	1361
15	2067	1843	1711	1625	1540	1456
16	2201	1962	1822	1730	1639	1550
17	2335	2081	1933	1835	1739	1644
18	2468	2200	2043	1940	1838	1738
19	2602	2320	2154	2045	1938	1832
20	2736	2439	2265	2150	2037	1926
21	2869	2558	2375	2255	2137	2020
22	3003	2677	2486	2360	2236	2114
23	3137	2796	2586	2465	2336	2208
24	3270	2915	2707	2570	2435	2302
25	3404	3034	2818	2675	2535	2396
26	3537	3153	2929	2780	2634	2490
27	3671	3273	3039	2885	2734	2585
28	3805	3392	3149	2990	2834	2679
29	3938	3511	3260	3096	2933	2773
30	4072	3630	3371	3201	3033	2867

Table 19**Thermal power of heating bodies Kalor 600/160 depending on required air temperature and number of sections****Warm-water heating** **$t_{w1} = 55\text{ °C}$** **$t_{w2} = 45\text{ °C}$** ***Thermal power Q (W) at air temperature of t_i (°C)***

No of sections (n)	10	15	18	20	22	24
2	193	162	144	132	121	109
3	272	228	202	186	170	154
4	350	293	260	239	218	198
5	428	359	319	293	267	242
6	506	424	377	346	316	287
7	584	490	435	400	365	331
8	663	556	494	453	414	375
9	741	621	552	507	463	419
10	819	687	610	560	511	464
11	897	752	668	614	560	508
12	976	818	727	667	609	552
13	1054	883	785	721	658	597
14	1132	949	843	774	707	641
15	1210	1015	901	828	756	685
16	1288	1080	960	881	804	729
17	1367	1146	1018	935	853	774
18	1445	1211	1076	988	902	818
19	1523	1277	1134	1042	951	862
20	1601	1342	1193	1095	1000	907
21	1680	1408	1251	1149	1049	951
22	1758	1474	1309	1202	1097	995
23	1836	1539	1367	1256	1146	1039
24	1914	1605	1426	1309	1195	1084
25	1992	1670	1484	1363	1244	1128
26	2071	1736	1542	1416	1293	1172
27	2149	1802	1600	1470	1342	1217
28	2227	1867	1659	1523	1391	1261
29	2305	1933	1717	1577	1439	1305
30	2384	1998	1775	1630	1488	1349

Table 20

Thermal power of heating bodies Kalor 900/70 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90 \text{ }^\circ\text{C}$

$t_{w2} = 70 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	336	304	285	272	260	248
3	470	425	398	381	364	346
4	604	546	512	489	467	445
5	738	667	625	598	570	544
6	872	788	738	706	674	642
7	1006	909	852	814	777	741
8	1140	1030	965	923	881	840
9	1274	1151	1079	1031	984	938
10	1407	1272	1192	1140	1088	1037
11	1541	1393	1305	1278	1191	1135
12	1675	1514	1419	1356	1295	1234
13	1809	1634	1532	1465	1398	1333
14	1943	1755	1645	1573	1502	1431
15	2077	1876	1759	1682	1605	1530
16	2211	1997	1872	1790	1709	1629
17	2345	2118	1986	1898	1812	1727
18	2478	2239	2099	2007	1916	1826
19	2612	2360	2212	2115	2019	1924
20	2746	2481	2326	2224	2123	2023
21	2880	2602	2439	2332	2226	2122
22	3014	2723	2552	2440	2330	2220
23	3148	2844	2666	2549	2433	2319
24	3282	2965	2779	2657	2537	2418
25	3416	3086	2893	2766	2640	2516
26	3549	3207	3006	2874	2744	2615
27	3683	3328	3119	2982	2847	1813
28	3817	3449	3233	3091	2950	2812
29	3951	3570	3346	3199	3054	2911
30	4085	3691	3459	3307	3157	3009

Table 21
Thermal power of heating bodies Kalor 900/70 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	272	242	224	212	201	189
3	381	338	313	297	281	265
4	489	434	402	381	360	340
5	598	530	491	466	440	415
6	706	627	580	550	520	491
7	814	723	669	634	600	566
8	923	819	759	719	680	641
9	1031	915	848	803	760	717
10	1140	1012	937	888	839	792
11	1248	1108	1026	972	919	867
12	1356	1204	1115	1057	999	943
13	1465	1300	1204	1141	1079	1018
14	1573	1396	1293	1226	1159	1093
15	1682	1493	1382	1310	1239	1169
16	1790	1589	1471	1394	1319	1244
17	1898	1685	1560	1479	1398	1319
18	2007	1781	1650	1563	1478	1395
19	2115	1878	1739	1648	1558	1470
20	2224	1974	1828	1732	1638	1545
21	2332	2070	1917	1817	1718	1621
22	2440	2166	2006	1901	1798	1696
23	2549	2262	2095	1986	1878	1771
24	2657	2359	2184	2070	1957	1847
25	2766	2455	2273	2154	2037	1922
26	2874	2551	2362	2239	2117	1997
27	2982	2647	2452	2323	2197	2073
28	3091	2743	2541	2408	2277	2148
29	3199	2840	2630	2492	2357	2223
30	3307	2936	2719	2577	2437	2299

Table 22
Thermal power of heating bodies Kalor 900/70 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55\text{ °C}$
 $t_{w2} = 45\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	156	130	115	105	96	87
3	219	182	161	147	134	121
4	281	234	207	189	172	156
5	343	286	253	231	210	190
6	405	337	298	273	249	225
7	467	389	344	315	287	259
8	530	441	390	357	325	297
9	592	493	436	399	363	328
10	654	545	482	441	401	363
11	716	596	528	483	439	397
12	778	648	573	525	478	431
13	841	700	619	567	516	466
14	903	752	665	609	554	500
15	965	804	711	651	592	535
16	1027	856	757	693	630	569
17	1089	907	803	735	668	604
18	1152	959	848	777	707	638
19	1214	1011	894	819	745	673
20	1276	1063	940	861	783	707
21	1338	1115	986	902	821	742
22	1400	1166	1032	944	859	776
23	1463	1218	1078	986	897	811
24	1525	1270	1123	1028	936	845
25	1587	1322	1169	1070	974	880
26	1649	1374	1215	1112	1012	914
27	1712	1425	1261	1154	1050	949
28	1774	1477	1307	1196	1088	983
29	1836	1529	1352	1238	1126	1018
30	1898	1581	1398	1280	1165	1052

Table 23

Thermal power of heating bodies Kalor 900/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90 \text{ }^\circ\text{C}$

$t_{w2} = 70 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	580	523	490	468	447	426
3	810	731	685	655	624	595
4	1041	940	880	841	802	764
5	1272	1148	1070	1027	980	933
6	1503	1356	1270	1214	1158	1103
7	1733	1564	1465	1400	1336	1272
8	1964	1772	1660	1586	1513	1441
9	2195	1980	1885	1772	1691	1611
10	2426	2189	2050	1959	1869	1780
11	2656	2397	2245	2145	2047	1949
12	2887	2605	2440	2331	2224	2119
13	3118	2813	2635	2518	2402	2288
14	3348	3021	2830	2704	2580	2457
15	3579	3230	3025	2890	2758	2627
16	3810	3438	3220	3077	2935	2796
17	4041	3646	3415	3263	3113	2965
18	4271	3854	3610	3449	3291	3135
19	4502	4062	3805	3636	3469	3304
20	4733	4271	4000	3822	3647	3473
21	4963	4479	4195	4008	3824	3643
22	5194	4687	4390	4195	4002	3812
23	5425	4895	4585	4381	4180	3981
24	5656	5103	4780	4567	4358	4151
25	5886	5312	4975	4754	4535	4320
26	6117	5520	5170	4940	4713	4489
27	6348	5728	5365	5126	4891	4659
28	6578	5936	5560	5313	5069	4828
29	6809	6144	5755	5499	5246	4997
30	7040	6352	5950	5685	5424	5167

Table 24

Thermal power of heating bodies Kalor 900/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	468	415	384	364	344	324
3	655	580	537	508	480	453
4	841	745	690	653	617	582
5	1027	910	842	798	754	711
6	1214	1076	995	942	891	840
7	1400	1241	1148	1087	1027	968
8	1586	1406	1301	1232	1164	1097
9	1772	1571	1454	1377	1301	1226
10	1959	1736	1606	1521	1438	1355
11	2145	1901	1759	1666	1574	1484
12	2331	2066	1912	1811	1711	1613
13	2518	2232	2065	1955	1848	1742
14	2704	2397	2217	2100	1985	1871
15	2890	2562	2370	2245	2121	2000
16	3077	2727	2523	2390	2258	2129
17	3263	2892	2676	2534	2395	2258
18	3449	3057	2829	2679	2532	2386
19	3636	3223	2981	2824	2668	2515
20	3822	3388	3134	2968	2805	2644
21	4008	3553	3287	3113	2942	2773
22	4195	3718	3440	3259	3079	2902
23	4381	3883	3593	3402	3215	3031
24	4567	4048	3745	3547	3352	3160
25	4754	4213	3898	3692	3489	3289
26	4940	4379	4051	3837	3625	3418
27	5126	4544	4204	3981	3762	3547
28	5313	4709	4357	4126	3899	3676
29	5499	4874	4509	4271	4036	3804
30	5685	5039	4662	4415	4172	3933

Table 25
Thermal power of heating bodies Kalor 900/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55 \text{ }^{\circ}\text{C}$

$t_{w2} = 45 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	267	227	196	179	163	147
3	373	310	274	250	228	205
4	479	398	352	322	292	264
5	585	487	430	393	357	322
6	692	575	508	464	422	381
7	798	663	586	535	487	439
8	904	751	664	607	551	498
9	1010	840	741	678	616	556
10	1116	928	819	749	681	614
11	1223	1016	897	821	746	673
12	1329	1104	975	892	810	731
13	1435	1193	1053	963	875	790
14	1541	1281	1131	1034	940	848
15	1647	1369	1209	1106	1005	907
16	1754	1457	1287	1177	1070	965
17	1860	1546	1365	1248	1134	1024
18	1966	1634	1443	1319	1199	1082
19	2072	1722	1521	1391	1264	1140
20	2179	1810	1599	1462	1329	1199
21	2285	1899	1677	1533	1393	1257
22	2391	1987	1755	1605	1458	1316
23	2497	2075	1833	1676	1523	1374
24	2603	2163	1911	1747	1588	1433
25	2710	2252	1989	1818	1652	1491
26	2816	2340	2066	1890	1717	1550
27	2922	2428	2144	1961	1782	1608
28	3028	2516	2222	2032	1847	1666
29	3134	2605	2300	2103	1912	1725
30	3241	2693	2378	2175	1976	1783

STEAM HEATING

Steam condensation temperature $t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Table 26**Thermal power of heating bodies Kalor 350/160 depending on required air temperature and number of sections****Steam heating** **$t_{pk} = 101,5 \text{ }^{\circ}\text{C}$** ***Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)***

No of sections (n)	10	15	18	20	22	24
2	360	334	318	308	298	288
3	524	485	463	448	433	419
4	687	637	607	588	569	549
5	851	789	752	728	704	680
6	1014	940	897	868	839	811
7	1178	1092	1041	1008	975	942
8	1342	1244	1186	1148	1110	1072
9	1505	1395	1330	1288	1245	1203
10	1669	1547	1475	1428	1381	1334
11	1832	1699	1620	1567	1516	1465
12	1996	1850	1764	1707	1651	1595
13	2159	2002	1909	1847	1786	1726
14	2323	2153	2053	1987	1922	1857
15	2487	2305	2198	2127	2057	1988
16	2650	2457	2343	2267	2192	2118
17	2814	2608	2487	2407	2328	2249
18	2977	2760	2632	2547	2463	2380
19	3141	2912	2776	2687	2598	2511
20	3304	3063	2921	2827	2734	2641
21	3468	3215	3065	2967	2869	2772
22	3632	3367	3210	3107	3004	2903
23	3795	3518	3355	3247	3140	3034
24	3959	3670	3499	3387	3275	3164
25	4122	3821	3644	3527	3410	3295
26	4286	3973	3788	3667	3546	3426
27	4449	4125	3933	3806	3681	3557
28	4613	4276	4078	3946	3816	3687
29	4777	4428	4222	4086	3952	3818
30	4940	4580	4367	4226	4087	3949

Table 27

Thermal power of heating bodies Kalor 500/70 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	295	274	261	253	245	237
3	414	384	367	356	344	333
4	533	495	473	458	443	429
5	652	606	579	561	543	525
6	772	717	684	663	642	621
7	891	828	790	765	741	717
8	1010	938	896	868	840	812
9	1129	1049	1002	970	939	908
10	1249	1160	1107	1073	1038	1004
11	1368	1271	1213	1175	1138	1100
12	1487	1381	1319	1278	1237	1196
13	1606	1492	1425	1380	1336	1292
14	1725	1603	1530	1483	1435	1388
15	1845	1714	1636	1585	1534	1484
16	1964	1824	1742	1687	1633	1580
17	2083	1935	1848	1790	1733	1676
18	2202	2046	1953	1892	1832	1772
19	2322	2157	2059	1995	1931	1867
20	2441	2268	2165	2097	2030	1963
21	2560	2378	2271	2200	2129	2059
22	2679	2489	2376	2302	2228	2155
23	2799	2600	2482	2405	2628	2251
24	2918	2711	2588	2507	2427	2347
25	3037	2821	2694	2609	2526	2443
26	3156	2932	2800	2712	2625	2539
27	3276	3043	2905	2814	2724	2635
28	3395	3154	3011	2917	2823	2731
29	3514	3264	3117	3019	2923	2827
30	3633	3375	3223	3122	3022	2922

Table 28

Thermal power of heating bodies Kalor 500/110 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	371	344	328	318	307	297
3	539	500	477	462	447	432
4	708	657	627	607	584	567
5	876	813	776	751	727	703
6	1045	970	925	896	867	838
7	1213	1126	1074	1040	1006	973
8	1382	1282	1223	1185	1146	1108
9	1550	1439	1373	1329	1286	1243
10	1719	1595	1522	1747	1426	1378
11	1887	1751	1671	1618	1565	1513
12	2056	1908	1820	1762	1705	1648
13	2224	2064	1969	1907	1845	1783
14	2393	2221	2119	2051	1985	1919
15	2561	2377	2268	2196	2124	2054
16	2730	2533	2417	2340	2264	2189
17	2898	2690	2566	2485	2404	2324
18	3067	2846	2715	2629	2544	2459
19	3236	3002	2865	2774	2684	2594
20	3404	3159	3014	2918	2823	2729
21	3573	3315	3163	3063	2963	2864
22	3741	3472	3312	3207	3103	2999
23	3910	3628	3461	3352	3243	3135
24	4078	3784	3611	3496	3382	3270
25	7247	3910	3760	3641	3522	3405
26	4415	4097	3909	3785	3662	3540
27	4584	4253	4058	3929	3802	3675
28	4752	4410	4207	4074	3941	3810
29	4921	4566	4357	4218	4081	3975
30	5089	4723	4506	4363	4221	4080

Table 29**Thermal power of heating bodies Kalor 500/220 depending on required air temperature and number of sections****Steam heating** **$t_{pk} = 101,5 \text{ }^{\circ}\text{C}$** *Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)*

No of sections (n)	10	15	18	20	22	24
2	680	630	600	581	562	543
3	955	885	843	816	789	762
4	1230	1140	1086	1051	1016	982
5	1505	1395	1329	1286	1244	1201
6	1780	1650	1572	1521	1471	1421
7	2055	1904	1815	1757	1698	1641
8	2331	2159	2058	1992	1926	1860
9	2606	2414	2301	2227	2153	2080
10	2881	2669	2544	2462	2380	2299
11	3156	2924	2787	2697	2607	2519
12	3131	3179	3030	2932	2835	2738
13	3706	3434	3273	3167	3062	2958
14	3981	3689	3516	3402	3289	3178
15	4256	3944	3759	3637	3517	3397
16	4232	4199	4002	3873	3744	3617
17	4807	4454	4245	4108	3971	3836
18	5082	4708	4488	4343	4199	4056
19	5357	4963	4731	4578	4426	4275
20	5632	5218	4974	4813	4653	4495
21	5907	5473	5217	5048	4881	4715
22	6182	5728	5460	5283	5108	4934
23	6457	5983	5703	5518	5335	5154
24	6732	6238	5943	5753	5563	5373
25	7008	6493	6189	5988	5790	5593
26	7283	6748	6432	6224	6017	5812
27	8669	7003	6675	6459	6244	6032
28	7833	7257	6918	6694	6472	6252
29	8108	7512	7161	6929	6699	6471
30	8383	7767	7404	7164	6926	6691

Table 30
Thermal power of heating bodies Kalor 500/160 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	500	462	440	425	411	397
3	772	672	640	619	598	577
4	954	882	840	812	784	757
5	1181	1092	1040	1005	971	937
6	1408	1302	1240	1199	1158	1118
7	1636	1513	1440	1392	1345	1298
8	1863	1723	1640	1586	1532	1478
9	2090	1933	1840	1779	1718	1658
10	2317	2143	2040	1972	1905	1839
11	2544	2353	2240	2166	2092	2019
12	2772	2563	2440	2359	2279	2199
13	2999	2773	2640	2552	2466	2380
14	3226	2983	2840	2746	2652	2560
15	3453	3193	3040	2939	2839	2740
16	3680	3403	3240	3132	3026	2920
17	3908	3613	3440	3326	3213	3101
18	4135	3823	3640	3519	3399	3281
19	4362	4033	3840	3712	3586	3461
20	4589	4244	4040	3906	3773	3641
21	4816	4454	4240	4099	3960	3822
22	5043	4664	4440	4293	4147	4002
23	5271	4874	4640	4486	4333	4182
24	5498	5084	4840	4679	4520	4363
25	5725	5294	5040	4873	4707	4243
26	5952	5504	5240	5066	4894	4723
27	6179	5714	5440	5259	5080	4903
28	6407	5924	5640	5453	5267	5084
29	3363	6334	5840	5646	5454	5264
30	6861	6344	6040	5839	5641	5444

Table 31**Thermal power of heating bodies Kalor 600/160 depending on required air temperature and number of sections****Steam heating** **$t_{pk} = 101,5 \text{ }^{\circ}\text{C}$** ***Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)***

No of sections (n)	10	15	18	20	22	24
2	610	566	540	523	506	490
3	856	795	759	735	735	688
4	1103	1024	978	947	916	886
5	1350	1253	1196	1158	1121	1084
6	1597	1482	1414	1370	1326	1282
7	1843	1711	1633	1582	1531	1480
8	2090	1940	1852	1794	1736	1678
9	2337	2170	2071	2005	1941	1877
10	2583	2399	2289	2217	2146	2075
11	2830	2628	2508	2429	2351	2273
12	3077	2857	2727	2641	2555	2471
13	3324	3086	2945	2852	2760	2669
14	3570	3315	3164	3064	2965	2867
15	3817	3544	3383	3276	3170	3065
16	4064	3773	3601	3488	3375	3263
17	4310	4002	3820	3699	3580	3462
18	4557	4231	4038	3911	3785	3660
19	4804	4460	4257	4123	3990	3858
20	5051	4689	4476	4335	4195	4056
21	5297	4918	4694	4546	4440	4254
22	5540	5147	4913	4758	4605	4452
23	2791	5376	5132	4970	4809	4650
24	6037	5606	5350	5152	5014	4848
25	6284	5835	5569	5393	5219	5047
26	6531	6064	5788	5605	5424	5245
27	6778	6293	6006	5817	5629	5443
28	7024	6522	6225	6029	5834	5641
29	7271	6751	6443	6240	6039	5839
30	7518	6980	6662	6452	6244	6037

Table 32

Thermal power of heating bodies Kalor 900/70 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	513	475	453	438	423	409
3	718	665	633	612	592	572
4	922	854	813	787	761	734
5	1126	1043	994	961	929	897
6	1331	1232	1174	1136	1098	1060
7	1535	1421	1354	1310	1266	1223
8	1739	1610	1534	1484	1435	1385
9	1943	1799	1715	1659	1603	1548
10	2148	1989	1895	1833	1772	1711
11	2352	2178	2075	2007	1940	1874
12	2556	2367	2255	2182	2109	2036
13	2761	2556	2436	2356	2277	2199
14	2965	2745	2616	2530	2446	2362
15	3169	2934	2796	2705	2614	2525
16	3374	3124	2976	2879	2783	2687
17	3578	3313	3156	3053	2951	2850
18	3782	3502	3337	3228	3120	3013
19	3986	3691	3517	3402	3288	3175
20	4191	3880	3697	3576	3457	3338
21	4395	4069	3877	3751	3625	3501
22	4599	4259	4058	3925	3794	3664
23	4804	4448	4238	4099	3962	3826
24	5008	4637	4418	4274	4131	3989
25	5212	4826	4598	4448	4299	4152
26	5417	5015	4779	4623	4468	4315
27	5621	5204	4959	4797	4636	4477
28	5825	5394	5139	4971	4805	4640
29	6029	5583	5319	5146	4973	4803
30	6234	5772	5500	5320	5142	4966

Table 33

Thermal power of heating bodies Kalor 900/160 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	889	822	783	757	731	706
3	1242	1149	1094	1058	1022	987
4	1596	1476	1406	1359	1313	1268
5	1950	1804	1717	1661	1604	1549
6	2303	2131	2029	1962	1895	1830
7	2657	2458	2341	2263	2187	2111
8	3011	2785	2652	2564	2478	2392
9	3364	3112	2964	2866	2769	2672
10	3718	3439	3275	3167	3060	2953
11	4072	3767	3587	3468	3351	3234
12	4425	4094	3898	3769	3642	3515
13	4779	4421	4210	4071	3933	3796
14	5133	4748	4521	4372	4224	4077
15	5486	5075	4833	4673	4515	4358
16	5840	5402	5144	4974	4806	4639
17	6194	5729	5456	5275	5097	4920
18	6547	6057	5767	5577	5388	5201
19	6901	6384	6079	5878	5679	5482
20	7255	6711	6390	6179	5970	5763
21	7608	7038	6702	6480	6261	6044
22	7962	7365	7013	6782	6552	6325
23	8316	7692	7325	7083	6843	6606
24	8669	8020	7637	7384	7134	6886
25	9023	8347	7948	7685	7425	7167
26	9377	8674	8260	7987	7716	7448
27	9730	9001	8571	8288	8007	7729
28	10084	9328	8883	8589	8298	8010
29	10438	9655	9194	8890	8589	8291
30	10791	9982	9506	9192	8880	8572

CAST-IRON HEATING BODIES

KALOR 3

KALOR 3

DESCRIPTION

Cast-iron heating body consisting of sections with extended transfer surface forming the front panel area of the heating body connected into heating systems using steel nipples with external right-hand or left-hand thread G 5/4" is manufactured in five sizes:

350/160 mm, 500/70 mm, 500/110 mm, 500/160 mm and 900/70 mm.

Heating bodies comply with EN 442 – 1 and EN 442 – 2. The material used is a grey cast-iron corresponding to EN 1561. The design of castings ensures a long life cycle of products.

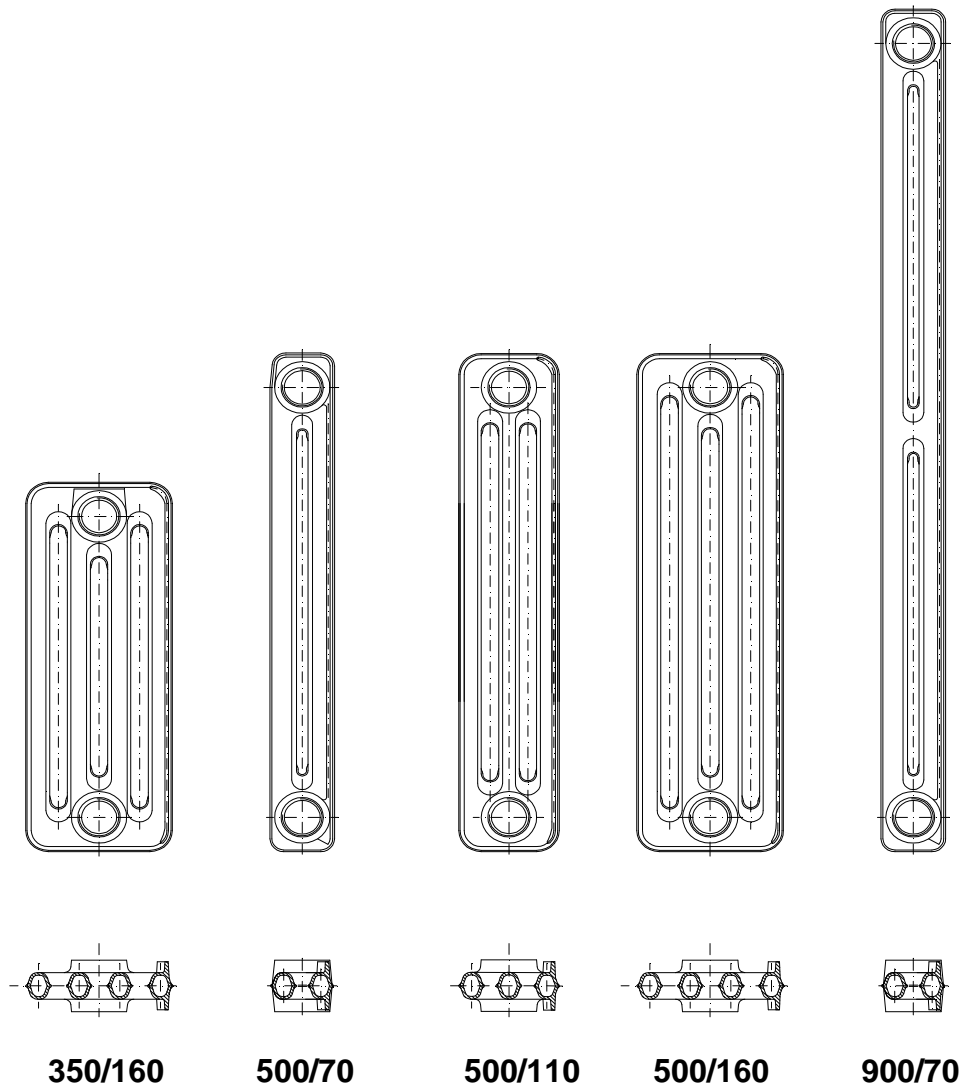


Fig. 1 Heating sections of Kalor 3 type

USAGE

All heating bodies of Kalor 3 line are designed for warm-water central heating systems with gravity and forced circulation of heating water with the highest operating temperature not exceeding 115 °C and highest operating overpressure of up to 0.6 MPa. In addition to this all sizes are also designed for steam central heating systems with the maximum operating overpressure of up to 0.07 MPa.

THERMAL AND TECHNICAL PARAMETERS

All types of Kalor 3 are certified by SZÚ Brno Thermal and technical parameters of the heat-transfer fluid (water) have been verified experimentally in compliance with EN 442-1 amendment A1.

The basic technical properties are provided in Table 1. Indicated thermal power applies to the heat-transfer fluid (water) with the temperature gradient of 75/65 °C. Connection of bodies is one-sided and the heat-transfer fluid is supplied at the top. The body is measured without covers.

Tables 2 through 21 provide thermal power values for various numbers of sections (2 – 30), various room temperatures, water temperature gradient of 55/45 °C and steam heating.

Table 1 Significant thermal and technical parameters of Kalor 3 heating sections

Property	Symbol	350/160	500/70	500/110	500/160	900/70
Identification number		17	19	21	23	25
Total height	H (mm)	430	580	580	580	980
Spacing	h (mm)	350	500	500	500	900
Depth	B (mm)	160	70	110	160	70
Width	L (mm)	60	60	60	60	60
Connection thread	G	5/4	5/4	5/4	5/4	5/4
Weight	M (kg/pc.)	4,90	3,70	4,70	6,20	6,10
Equivalent heating area	S_L (m ² /pc.)	0,208	0,163	0,215	0,290	0,240
Water volume	V (dm ³ /pc.)	0,8	0,5	0,8	1,1	0,8
Thermal power	Q_{Tn} (W/section)	82,9	60,8	78,3	102,2	95,8
Thermal module	Q_M (W/m)	1782	1305	1688	2216	2084
Temperature exponent	n (-)	1,251	1,26	1,255	1,294	1,306

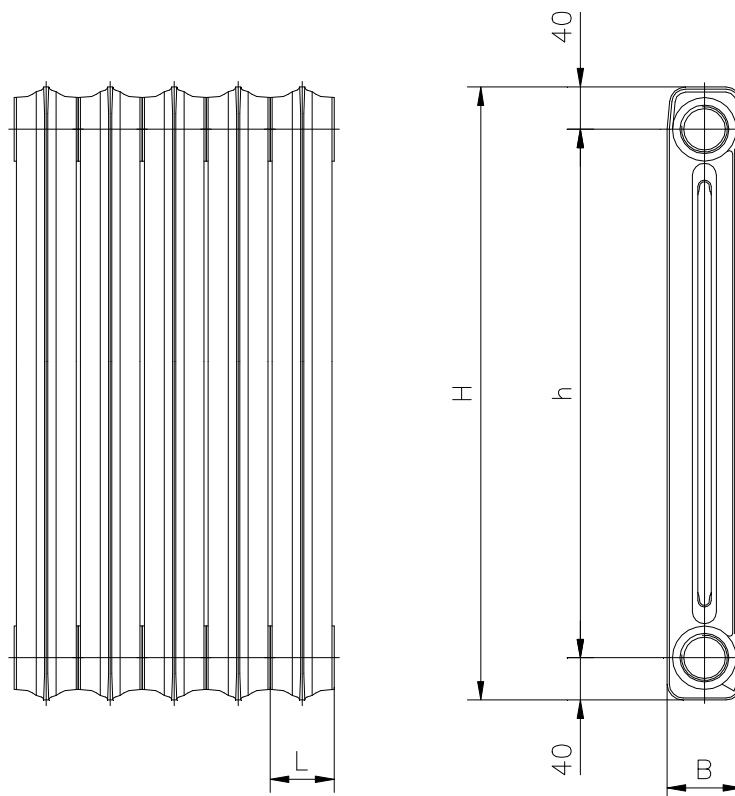


Fig. 2 Standard dimensions of Kalor 3 sections

TESTING OVERPRESSURE

Units manufactured are subject to the pressure test performed in manufacturer's facility using overpressure of cold water equal to 1 MPa.

ASSEMBLY

In order to achieve required thermal power it is necessary to maintain the installation position indicated on Fig. 3. In addition to this it is most beneficial to secure a minimum overlap of window sill from the viewpoint of thermal power.

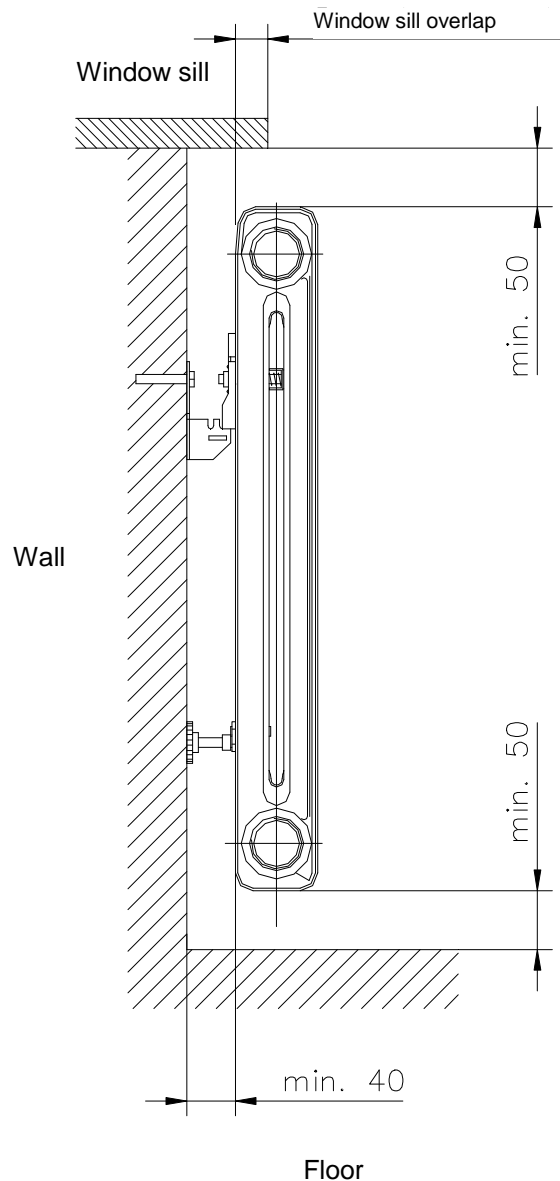


Fig. 3 Installation of Kalor 3 heating bodies

Kalor 3 line heating bodies are connected to the distribution piping using roses provided with external thread G 5/4" with G 3/8", G 1/2", G 3/4" and G 1" bores (**warning: don't use hemp as sealing under these rosettes**).

When facing the front panel surface, the bodies are provided on the left side with rose with right-hand thread and on the right side with rose with left-hand thread G 5/4". Openings of the heating body on the opposite side to the connection are usually terminated by solid plugs provided with external left-hand thread G 5/4". The upper plug can be provided with a bore with eccentrically positioned thread G 1/4" for the air relief valve. Automatic air relief valves are suitable for this purpose. Prior to combining the individual units supplied it is necessary to perform a thorough cleaning of contact surfaces of sections. We recommend to seal joints by Clingerite, which is normally used during production and it is suitable both for warm-water and steam systems. The sections shall be coupled with the torque of min. 130 Nm and max. 150 Nm. by means of steel nipples.

Gyroscopic moment for tightening of rosettes is from 130 Nm to 150 Nm.

Other installation data are provided in the section of instruction manual common for all models of heating bodies manufactured.

THERMAL POWER TABLES FOR INDIVIDUAL MODELS OF HEATING BODIES

WARM-WATER HEATING

Temperature gradient to EN 442 – 2

Temperature gradients 90/70 °C
 75/65 °C
 55/45 °C

Table 2
Thermal power of heating bodies Kalor 3 350/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90\text{ }^{\circ}\text{C}$
 $t_{w2} = 70\text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	293	267	252	242	232	222
3	415	378	356	342	328	314
4	536	488	460	442	423	405
5	657	599	564	542	519	497
6	778	709	668	641	615	588
7	899	819	772	741	710	680
8	1020	930	876	841	806	772
9	1141	1040	980	941	902	863
10	1262	1150	1084	1041	998	955
11	1383	1261	1188	1141	1093	1046
12	1504	1371	1293	1241	1189	1138
13	1626	1482	1397	1340	1285	1230
14	1747	1592	1501	1440	1380	1321
15	1868	1702	1605	1540	1476	1413
16	1989	1813	1709	1640	1572	1504
17	2110	1923	1813	1740	1668	1596
18	2231	2034	1917	1840	1763	1688
19	2352	2144	2021	1940	1859	1779
20	2473	2254	2125	2039	1955	1871
21	2594	2365	2229	2139	2050	1962
22	2715	2475	2333	2239	2146	2054
23	2837	2595	2437	2339	2242	2146
24	2958	2696	2541	2439	2338	2237
25	3079	2806	2645	2539	2433	2329
26	3200	2917	2749	2639	2529	2420
27	3321	3027	2853	2738	2625	2512
28	3442	3137	2957	2838	2720	2604
29	3563	3248	3061	2938	2816	2695
30	3684	3358	3165	3038	2912	2787

Table 3
Thermal power of heating bodies Kalor 3 350/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	242	217	202	193	183	174
3	342	307	286	272	259	245
4	442	396	369	352	334	317
5	542	486	453	431	410	388
6	641	575	536	611	485	460
7	741	665	620	590	561	532
8	841	754	703	670	636	603
9	941	844	787	749	712	675
10	1041	934	870	829	787	747
11	1141	1023	954	908	863	818
12	1241	1113	1037	988	938	890
13	1340	1202	1121	1067	1014	961
14	1440	1292	1204	1147	1089	1033
15	1540	1381	1288	1226	1165	1105
16	1640	1471	1371	1306	1241	1176
17	1740	1560	1455	1385	1316	1248
18	1840	1650	1538	1465	1392	1319
19	1940	1740	1622	1544	1467	1391
20	2039	1829	1705	1524	1543	1463
21	2139	1919	1789	1703	1618	1534
22	2239	2008	1872	1783	1694	1606
23	2339	2098	1956	1862	1769	1678
24	2439	2187	2039	1942	1845	1749
25	2539	2277	2123	2024	1920	1824
26	2639	2366	2206	2101	1996	1892
27	2738	2456	2290	2180	2071	1964
28	2838	2546	2373	2259	2147	2036
29	2938	2635	2457	2339	2223	2107
30	3038	2725	2540	2418	2298	2179

Table 4
Thermal power of heating bodies Kalor 3 350/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55\text{ °C}$

$t_{w2} = 45\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	146	123	110	102	93	85
3	206	174	156	144	132	120
4	266	225	201	186	170	155
5	326	276	247	228	209	190
6	386	327	292	269	247	225
7	446	378	338	311	286	260
8	506	429	383	353	324	295
9	567	479	429	395	363	331
10	627	530	474	437	401	366
11	687	581	520	479	440	401
12	747	632	565	521	478	436
13	807	683	611	563	517	471
14	867	734	656	605	555	506
15	927	785	702	647	594	541
16	988	836	747	689	632	576
17	1048	887	792	731	671	611
18	1108	937	838	773	709	646
19	1168	988	883	815	748	681
20	1228	1039	929	857	786	716
21	1288	1090	974	899	825	752
22	1348	1141	1020	941	863	787
23	1408	1192	1065	983	902	822
24	1469	1243	1111	1025	940	857
25	1529	1294	1156	1067	978	892
26	1589	1344	1202	1109	1017	927
27	1649	1395	1247	1151	1055	962
28	1709	1446	1293	1193	1094	997
29	1769	1497	1338	1235	1132	1032
30	1829	1548	1384	1276	1171	1067

Table 5
Thermal power of heating bodies Kalor 3 500/70 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90 \text{ }^{\circ}\text{C}$
 $t_{w2} = 70 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	219	200	188	181	173	166
3	308	281	264	254	243	233
4	397	361	341	327	313	300
5	486	442	417	400	383	367
6	574	523	493	473	453	434
7	663	604	569	546	523	501
8	752	685	645	619	593	568
9	841	766	721	692	663	635
10	929	846	798	765	733	702
11	1018	927	874	838	803	769
12	1107	1008	950	911	873	836
13	1196	1089	1026	985	943	903
14	1284	1170	1102	1058	1013	970
15	1373	1251	1178	1131	1083	1037
16	1462	1332	1255	1204	1153	1104
17	1551	1412	1331	1277	1223	1171
18	1639	1493	1407	1350	1294	1238
19	1728	1574	1483	1423	1364	1305
20	1817	1655	1559	1496	1434	1372
21	1906	1736	1635	1569	1504	1439
22	1994	1817	1712	1642	1574	1506
23	2083	1897	1788	1715	1644	1573
24	2172	1978	1864	1788	1714	1640
25	2261	2059	1940	1862	1784	1707
26	2349	2140	2016	1935	1854	1774
27	2438	2221	2092	2008	1924	1841
28	2527	2302	2169	2081	1994	1908
29	2616	2382	2245	2154	2064	1975
30	2704	2463	2321	2227	2134	2042

Table 6
Thermal power of heating bodies Kalor 3 500/70 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75 \text{ }^{\circ}\text{C}$

$t_{w2} = 65 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	181	162	151	144	136	129
3	254	227	212	202	192	182
4	327	293	273	260	247	234
5	400	358	334	318	302	286
6	473	424	395	376	357	338
7	546	489	456	434	412	391
8	619	555	517	492	467	443
9	692	620	578	550	523	495
10	765	686	639	608	578	548
11	838	751	700	666	633	600
12	911	817	761	724	688	652
13	985	882	822	782	743	704
14	1058	948	883	841	798	757
15	1131	1013	944	899	854	809
16	1204	1079	1005	957	909	861
17	1277	1144	1066	1015	964	914
18	1350	1210	1127	1073	1019	966
19	1423	1275	1188	1131	1074	1018
20	1496	1341	1249	1189	1129	1070
21	1569	1406	1310	1247	1185	1123
22	1642	1472	1371	1305	1240	1175
23	1715	1537	1432	1363	1295	1227
24	1788	1603	1493	1421	1350	1280
25	1862	1668	1554	1479	1405	1332
26	1935	1734	1615	1538	1460	1384
27	2008	1799	1676	1596	1416	1436
28	2081	1865	1737	1654	1571	1489
29	2154	1930	1799	1712	1626	1541
30	2227	1996	1860	1770	1681	1593

Table 7
Thermal power of heating bodies Kalor 3 500/70 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55 \text{ }^\circ\text{C}$

$t_{w2} = 45 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	108	92	82	75	69	63
3	152	129	115	106	97	88
4	196	166	148	136	125	114
5	240	203	181	167	153	139
6	284	240	214	197	181	165
7	328	277	247	228	209	190
8	371	314	280	259	237	216
9	415	351	314	289	265	241
10	459	388	347	320	293	267
11	503	425	380	350	321	292
12	547	462	413	381	349	318
13	591	499	446	411	377	343
14	635	536	479	442	405	369
15	678	573	512	472	433	394
16	722	610	545	503	461	420
17	766	647	578	533	489	445
18	810	685	611	564	517	471
19	854	722	645	594	545	496
20	898	759	678	625	573	522
21	941	796	711	655	601	547
22	985	833	744	686	629	573
23	1029	870	777	716	657	598
24	1073	907	810	747	685	624
25	1117	944	843	777	713	649
26	1161	981	876	808	741	675
27	1205	1018	909	838	769	711
28	1248	1055	942	869	796	725
29	1292	1092	976	899	824	751
30	1336	1129	1009	930	852	776

Table 8
Thermal power of heating bodies Kalor 3 500/110 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90 \text{ }^{\circ}\text{C}$
 $t_{w2} = 70 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	282	257	242	232	223	213
3	396	361	340	326	313	299
4	510	465	438	421	403	386
5	624	569	536	515	493	472
6	738	673	634	609	583	558
7	853	777	732	703	673	644
8	967	881	830	797	764	731
9	1081	985	928	891	854	817
10	1195	1089	1026	985	944	903
11	1309	1193	1124	1079	1034	989
12	1423	1297	1222	1173	1124	1076
13	1537	1401	1320	1267	1214	1162
14	1651	1505	1418	1361	1304	1248
15	1766	1609	1516	1455	1394	1334
16	1880	1713	1614	1549	1485	1421
17	1994	1817	1712	1643	1575	1507
18	2108	1921	1810	1737	1665	1593
19	2222	2025	1908	1831	1755	1679
20	2336	2129	2006	1925	1845	1766
21	2450	2233	2104	2019	1935	1852
22	2564	2337	2202	2113	2025	1938
23	2679	2441	2300	2207	2115	2024
24	2793	2545	2398	2301	2206	2111
25	2907	2649	2496	2395	2296	2197
26	3021	2753	2594	2490	2386	2283
27	3135	2857	2692	2584	2476	2369
28	3249	2961	2790	2678	2566	2456
29	3363	3065	2888	2772	2656	2542
30	3477	3169	2986	2866	2746	2628

Table 9
Thermal power of heating bodies Kalor 3 500/110 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	232	208	194	185	176	167
3	326	293	273	260	247	234
4	421	377	351	334	318	301
5	515	461	430	409	389	369
6	609	546	509	484	460	436
7	703	630	587	559	531	403
8	797	714	666	634	602	571
9	891	799	744	709	673	638
10	985	883	823	783	744	706
11	1079	967	901	858	815	773
12	1173	1052	980	933	886	840
13	1267	1136	1059	1008	957	908
14	1361	1220	1137	1083	1029	975
15	1455	1304	1216	1157	1100	1042
16	1549	1389	1294	1232	1171	1110
17	1643	1473	1373	1307	1242	1177
18	1737	1557	1452	1382	1313	1245
19	1831	1642	1530	1457	1384	1312
20	1925	1726	1609	1531	1455	1379
21	2019	1810	1687	1606	1526	1447
22	2113	1895	1766	1681	1597	1514
23	2207	1979	1845	1756	1668	1581
24	2301	2063	1923	1831	1739	1649
25	2395	2148	2002	1906	1810	1716
26	2490	2232	2080	1980	1881	1784
27	2584	2316	2159	2055	1953	1851
28	2678	2401	2237	2130	2024	1918
29	2772	2485	2316	2205	2095	1986
30	2866	2569	2395	2280	2166	2053

Table 10
Thermal power of heating bodies Kalor 3 500/110 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55 \text{ }^\circ\text{C}$

$t_{w2} = 45 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	140	118	106	97	89	81
3	196	166	148	137	125	114
4	253	214	191	176	162	147
5	309	262	234	216	198	180
6	366	309	277	255	234	213
7	422	357	319	294	270	246
8	479	405	362	334	306	279
9	535	453	405	373	342	312
10	592	501	447	413	378	345
11	649	549	490	452	415	378
12	705	596	533	491	451	411
13	762	644	576	531	487	444
14	818	692	618	570	523	476
15	875	740	661	610	559	509
16	931	788	704	649	595	542
17	988	835	747	688	631	575
18	1044	883	789	728	667	608
19	1101	931	832	767	704	641
20	1157	979	875	807	740	674
21	1214	1027	917	846	776	707
22	1271	1074	960	885	812	740
23	1327	1122	1003	925	848	773
24	1384	1170	1046	964	884	806
25	1440	1218	1088	1004	920	839
26	1497	1266	1131	1043	957	872
27	1553	1314	1174	1083	993	905
28	1610	1361	1217	1122	1029	937
29	1666	1409	1259	1161	1065	970
30	1723	1457	1302	1201	1101	1003

Table 11**Thermal power of heating bodies Kalor 3 500/160 depending on required air temperature and number of sections****Warm-water heating** **$t_{w1} = 90\text{ °C}$** **$t_{w2} = 70\text{ °C}$** ***Thermal power Q (W) at air temperature of t_i (°C)***

No of sections (n)	10	15	18	20	22	24
2	388	353	332	318	304	291
3	537	488	459	440	421	402
4	686	623	586	562	538	514
5	835	758	713	684	654	625
6	983	894	841	806	771	737
7	1132	1029	968	928	888	848
8	1281	1164	1095	1049	1004	960
9	1430	1299	1222	1171	1121	1071
10	1579	1435	1349	1293	1238	1183
11	1728	1570	1477	1415	1355	1294
12	1877	1705	1604	1537	1471	1406
13	2026	1840	1731	1659	1588	1518
14	2174	1976	1858	1781	1705	1629
15	2323	2111	1986	1903	1821	1741
16	2472	2246	2113	2025	1938	1852
17	2621	2381	2240	2147	2055	1964
18	2770	2517	2367	2269	2172	2075
19	2919	2652	2495	2391	2288	2187
20	3068	2787	2622	2513	2405	2298
21	3216	2922	2749	2635	2522	2410
22	3365	3058	2876	2757	2638	2521
23	3514	3193	3003	2879	2755	2633
24	3663	3328	3131	3001	2872	2744
25	3812	3463	3258	3123	2989	2856
26	3961	3599	3385	3245	3102	2967
27	4110	3734	3512	3366	3222	3079
28	4258	3869	3640	3488	3339	3190
29	4407	4004	3767	3610	3455	3302
30	4556	4140	3894	3732	3572	3414

Table 12
Thermal power of heating bodies Kalor 3 500/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	318	284	264	251	238	225
3	440	393	365	347	329	312
4	562	502	467	444	421	398
5	684	611	568	540	512	485
6	806	720	669	636	604	571
7	928	829	771	733	695	658
8	1049	938	872	829	786	744
9	1171	1047	973	925	878	831
10	1293	1156	1075	1022	969	917
11	1415	1265	1176	1118	1060	1004
12	1537	1374	1277	1214	1152	1090
13	1659	1483	1379	1311	1243	1176
14	1781	1592	1482	1407	1334	1263
15	1903	1700	1581	1503	1426	1349
16	2025	1809	1683	1599	1517	1436
17	2147	1918	1784	1696	1609	1522
18	2269	2027	1885	1792	1700	1609
19	2391	2136	1987	1888	1791	1695
20	2513	2245	2088	1985	1883	1782
21	2635	2354	2189	2081	1974	1868
22	2757	2463	2291	2177	2065	1955
23	2879	2572	2392	2274	2157	2041
24	3001	2681	2493	2370	2248	2128
25	3123	2790	2595	2466	2339	2214
26	3245	2899	2696	2563	2431	2301
27	3366	3008	2797	2659	2522	2387
28	3488	3117	2899	2755	2614	2473
29	3610	3226	3000	2852	2705	2560
30	3732	3335	3101	2948	2796	2646

Table 13
Thermal power of heating bodies Kalor 3 500/160 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55 \text{ }^{\circ}\text{C}$

$t_{w2} = 45 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	188	158	141	130	119	108
3	260	219	195	179	164	149
4	332	280	249	229	210	190
5	405	340	303	279	255	232
6	477	401	357	329	300	273
7	549	462	411	378	346	314
8	621	522	465	428	391	356
9	693	583	519	478	437	397
10	765	644	573	527	482	438
11	838	705	627	577	528	480
12	910	765	682	627	573	521
13	982	826	736	677	619	562
14	1054	887	790	726	664	604
15	1126	947	844	776	710	645
16	1198	1008	898	826	755	686
17	1270	1069	952	876	801	728
18	1343	1130	1006	925	846	769
19	1415	1190	1060	975	892	810
20	1487	1251	1114	1025	937	852
21	1559	1312	1168	1075	983	893
22	1631	1372	1222	1124	1028	934
23	1703	1433	1276	1174	1074	976
24	1776	1494	1330	1224	1119	1017
25	1848	1555	1384	1273	1165	1058
26	1920	1615	1438	1323	1210	1100
27	1992	1676	1492	1373	1256	1141
28	2064	1737	1547	1423	1301	1182
29	2136	1797	1601	1472	1347	1223
30	2209	1858	1655	1522	1392	1265

Table 14
Thermal power of heating bodies Kalor 3 900/70 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90 \text{ }^\circ\text{C}$

$t_{w2} = 70 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	349	317	298	286	273	261
3	491	446	419	402	384	367
4	634	575	541	518	496	473
5	776	704	662	634	607	580
6	918	833	783	751	718	686
7	1060	962	905	867	829	792
8	1202	1091	1026	983	941	898
9	1345	1221	1148	1099	1052	1005
10	1487	1350	1269	1216	1163	1111
11	1629	1479	1390	1332	1274	1217
12	1771	1608	1512	1448	1385	1323
13	1913	1737	1633	1564	1497	1430
14	2055	1866	1754	1681	1608	1536
15	2198	1995	1876	1797	1719	1642
16	2340	2124	1997	1913	1830	1748
17	2482	2253	2118	2029	1942	1855
18	2624	2382	2240	2146	2053	1961
19	2766	2511	2361	2262	2164	2067
20	2909	2640	2482	2378	2275	2173
21	3051	2769	2604	2494	2386	2280
22	3193	2898	2725	2611	2498	2386
23	3335	3027	2846	2727	2609	2492
24	3477	3157	2968	2843	2720	2598
25	3619	3286	3089	2959	2831	2704
26	3762	3415	3210	3076	2943	2811
27	3904	3544	3332	3192	3054	2917
28	4046	3673	3453	3308	3165	3023
29	4188	3802	3574	3424	3276	3129
30	4330	3931	3696	3541	3387	3236

Table 15
Thermal power of heating bodies Kalor 3 900/70 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75 \text{ }^{\circ}\text{C}$
 $t_{w2} = 65 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	286	255	237	225	213	202
3	402	359	333	317	300	284
4	518	462	430	408	387	366
5	634	566	526	500	474	448
6	751	670	623	592	561	531
7	867	774	719	683	648	613
8	983	878	816	775	735	695
9	1099	981	912	866	821	777
10	1216	1085	1008	958	908	859
11	1332	1189	1105	1050	995	941
12	1448	1293	1201	1141	1082	1024
13	1564	1396	1298	1233	1169	1106
14	1681	1500	1394	1325	1256	1188
15	1797	1604	1491	1416	1343	1270
16	1913	1708	1587	1508	1430	1352
17	2029	1811	1683	1599	1516	1434
18	2146	1915	1780	1691	1603	1517
19	2262	2019	1876	1783	1690	1599
20	2378	2123	1973	1874	1777	1681
21	2494	2227	2069	1966	1864	1763
22	2611	2330	2166	2058	1951	1845
23	2727	2434	2262	2149	2038	1927
24	2843	2538	2359	2241	2124	2010
25	2959	2642	2455	2332	2211	2092
26	3076	2745	2551	2424	2298	2174
27	3192	2849	2648	2516	2385	2256
28	3308	2953	2744	2607	2472	2338
29	3424	3057	2841	2699	2559	2420
30	3541	3160	2937	2791	2646	2503

Table 16
Thermal power of heating bodies Kalor 3 900/70 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55\text{ °C}$

$t_{w2} = 45\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	168	141	126	116	106	96
3	237	199	177	163	149	135
4	305	256	228	210	191	174
5	374	314	279	257	234	213
6	442	371	330	304	277	252
7	510	429	381	351	320	291
8	579	486	433	398	363	330
9	647	544	484	445	406	369
10	716	601	535	492	449	408
11	784	659	586	539	492	447
12	853	716	637	586	535	486
13	921	774	688	633	578	525
14	990	831	740	680	621	564
15	1058	889	791	727	664	603
16	1127	946	842	774	707	642
17	1195	1004	893	824	750	681
18	1264	1061	944	868	793	720
19	1332	1119	995	915	836	759
20	1400	1176	1046	962	879	798
21	1469	1234	1098	1009	922	837
22	1537	1291	1149	1056	965	876
23	1606	1349	1200	1103	1008	915
24	1674	1406	1251	1150	1051	954
25	1743	1464	1302	1197	1094	993
26	1811	1521	1353	1244	1137	1032
27	1880	1579	1404	1291	1180	1071
28	1948	1636	1456	1338	1223	1110
29	2017	1694	1507	1385	1266	1149
30	2085	1751	1558	1432	1309	1188

STEAM HEATING

Steam condensation temperature $t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Table 17
Thermal power of heating bodies Kalor 3 350/160 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	439	409	391	379	368	356
3	620	578	553	536	520	503
4	801	746	714	693	671	650
5	982	915	875	849	823	797
6	1163	1084	1037	1006	975	945
7	1344	1252	1198	1163	1127	1092
8	1525	1421	1360	1319	1279	1239
9	1706	1590	1521	1476	1431	1386
10	1887	1759	1683	1632	1582	1533
11	2068	1927	1844	1789	1734	1680
12	2249	2096	2005	1946	1886	1827
13	2430	2265	2167	2102	2038	1974
14	2611	2433	2328	2259	2190	2121
15	2792	2602	2490	2415	2341	2268
16	2973	2771	2651	2572	2493	2415
17	3154	2940	2813	2729	2645	2562
18	3335	3108	2974	2885	2797	2709
19	3513	3277	3135	3042	2949	2856
20	3697	3446	3297	3198	3101	3003
21	3878	3614	3458	3355	3252	3150
22	4059	3783	3620	3512	3404	3297
23	4240	3952	3781	3668	3556	3444
24	4421	4121	3943	3825	3708	3591
25	4602	4289	4104	3981	3860	3739
26	4783	4458	4265	4138	4011	3886
27	4964	4627	4427	4295	4163	4033
28	5145	4796	4588	4451	4315	4180
29	5326	4964	4750	4608	4467	4327
30	5507	5133	4911	4765	4619	4474

Table 18

Thermal power of heating bodies Kalor 3 500/70 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	325	303	290	281	272	264
3	457	425	407	395	382	370
4	588	548	524	508	493	477
5	720	670	641	622	603	584
6	851	793	758	736	713	690
7	983	915	876	849	823	797
8	1114	1038	993	963	933	904
9	1246	1160	1110	1077	1043	1010
10	1377	1283	1227	1190	1154	1117
11	1509	1406	1344	1304	1264	1224
12	1640	1528	1462	1418	1374	1331
13	1772	1651	1579	1531	1484	1437
14	1903	1773	1696	1645	1594	1544
15	2035	1896	1813	1759	1704	1651
16	2166	2018	1930	1872	1815	1757
17	2298	2141	2048	1986	1925	1864
18	2429	2263	2165	2100	2035	1971
19	2561	2386	2282	2213	2145	2077
20	2692	2508	2399	2327	2255	2184
21	2824	2631	2516	2441	2365	2291
22	2955	2753	2634	2554	2476	2397
23	3087	2876	2751	2668	2586	2504
24	3218	2998	2868	2782	2696	2611
25	3350	3121	2985	2895	2806	2717
26	3481	3243	3102	3009	2916	2824
27	3613	3366	3220	3123	3026	2931
28	3744	3489	3337	3236	3137	3038
29	3876	3611	3454	3350	3247	3144
30	4007	3734	3571	3464	3357	3251

Table 19
Thermal power of heating bodies Kalor 3 500/110 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	431	402	384	373	361	350
3	606	564	540	524	508	492
4	780	727	695	675	654	633
5	955	890	851	825	800	775
6	1129	1052	1007	976	946	917
7	1303	1215	1162	1127	1093	1058
8	1478	1377	1318	1278	1239	1200
9	1652	1540	1473	1429	1385	1342
10	1827	1702	1629	1580	1531	1483
11	2001	1865	1784	1731	1678	1625
12	2176	2028	1940	1882	1824	1766
13	2350	2190	2095	2033	1970	1908
14	2525	2353	2251	2183	2116	2050
15	2699	2515	2406	2334	2263	2191
16	2874	2678	2562	2485	2409	2333
17	3048	2841	2717	2636	2555	2475
18	3223	3003	2873	2787	2701	2616
19	3397	3166	3029	2938	2848	2758
20	3571	3328	3184	3089	2994	2900
21	3746	3491	3340	3240	3140	3041
22	3920	3653	3495	3390	3286	3183
23	4095	3816	3651	3541	3433	3325
24	4269	3979	3806	3692	3579	3466
25	4444	4141	3962	3843	3725	3608
26	4618	4304	4117	3994	3871	3749
27	4793	4466	4273	4145	4018	3891
28	4967	4629	4428	4296	4164	4033
29	5142	4792	4584	4447	4310	4174
30	5316	4954	4739	4597	4456	4316

Table 20
Thermal power of heating bodies Kalor 3 500/160 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	569	529	505	490	474	459
3	787	732	699	678	656	635
4	1006	935	893	866	838	811
5	1224	1138	1087	1054	1020	987
6	1442	1341	1281	1242	1202	1163
7	1661	1544	1475	1430	1384	1339
8	1879	1747	1669	1617	1566	1516
9	2097	1950	1863	1805	1748	1692
10	2315	2153	2057	1993	1930	1868
11	2534	2356	2251	2181	2112	2044
12	2752	2559	2445	2369	2294	2220
13	2970	2762	2639	2557	2476	2396
14	3189	2965	2833	2745	2658	2572
15	3407	3168	3027	2933	2840	2748
16	3625	3371	3220	3121	3022	2924
17	3844	3574	3414	3309	3204	3100
18	4062	3777	3608	3497	3386	3276
19	4280	3980	3802	3685	3568	3453
20	4498	4183	3996	3873	3750	3629
21	4717	4386	4190	4061	3932	3805
22	4935	4589	4384	4249	4114	3981
23	5153	4792	4578	4437	4296	4157
24	5372	4995	4772	4625	4478	4333
25	5590	5198	4966	4813	4660	4509
26	5808	5401	5160	5000	4842	4685
27	6027	5604	5354	5188	5024	4861
28	6245	5807	5548	5376	5206	5037
29	6463	6010	5742	5564	5388	5213
30	6682	6213	5936	5752	5570	5390

Table 21

Thermal power of heating bodies Kalor 3 900/70 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	519	483	461	447	432	418
3	731	679	649	628	608	588
4	942	876	836	810	784	759
5	1154	1072	1024	992	960	929
6	1365	1269	1211	1174	1136	1099
7	1577	1465	1399	1355	1312	1269
8	1788	1661	1587	1537	1488	1439
9	1999	1858	1774	1719	1664	1610
10	2211	2054	1962	1901	1840	1780
11	2422	2251	2149	2082	2016	1950
12	2634	2447	2337	2264	2192	2120
13	2845	2644	2525	2446	2368	2290
14	3057	2840	2712	2628	2544	2461
15	3268	3037	2900	2810	2720	2631
16	3479	3233	3088	2991	2896	2801
17	3691	3430	3275	3173	3072	2971
18	3902	3626	3463	3355	3248	3141
19	4114	3823	3650	3537	3424	3312
20	4325	4019	3838	3718	3600	3482
21	4537	4216	4026	3900	3776	3652
22	4748	4412	4213	4082	3952	3822
23	4959	4608	4401	4264	4128	3992
24	5171	4805	4588	4445	4304	4163
25	5382	5001	4776	4627	4480	4333
26	5594	5198	4964	4809	4655	4503
27	5805	5394	5151	4991	4831	4673
28	6017	5591	5339	5173	5007	4844
29	6228	5787	5527	5354	5183	5014
30	6439	5984	5714	5536	5359	5184

CAST-IRON HEATING BODIES

TERMO

TERMO

DESCRIPTION

Cast-iron heating sections with reduced water volume and extended face transfer surface forming the front panel area connected into heating bodies using steel nipples with external right-hand or left-hand thread G 1" are manufactured in six models:

500/95 mm, 500/130 mm, 623/95 mm, 623/130 mm, 813/95 mm and 813/130 mm.

Heating bodies comply with EN 442 – 1 amendment A1. The material used is a grey cast-iron corresponding to EN 1561. The design of castings ensures a long life cycle of products.

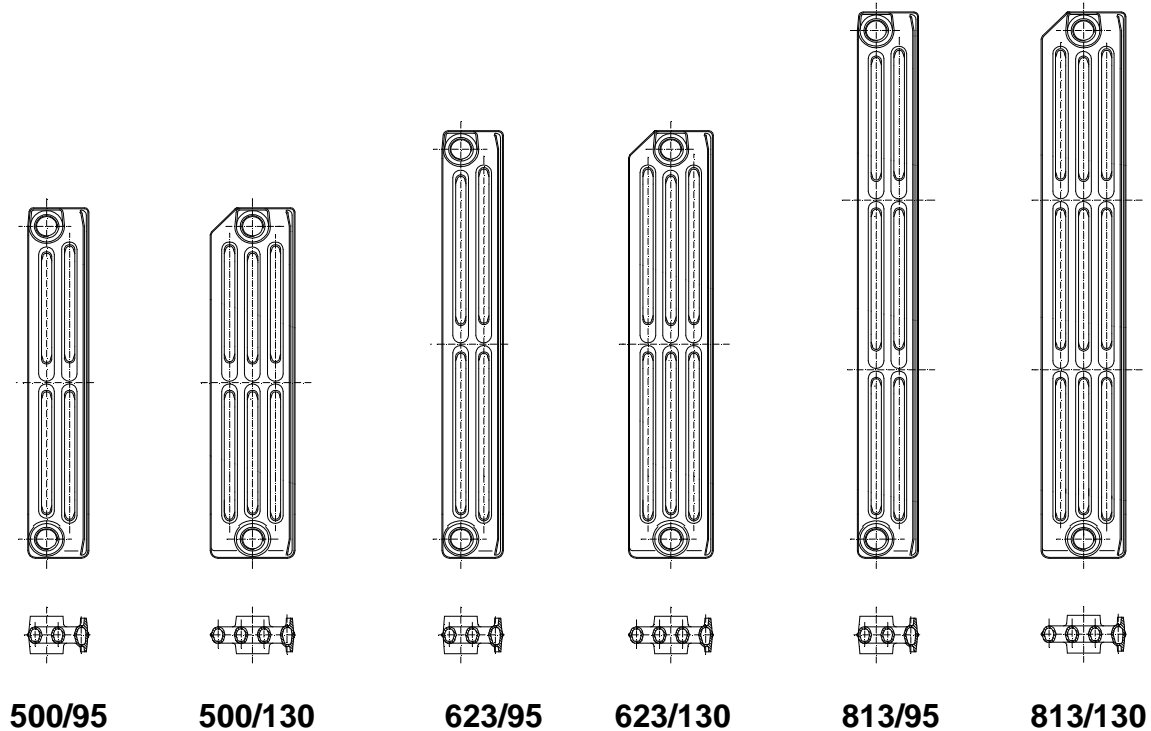


Fig. 1 Heating sections of Termo type

USAGE

All heating bodies of Termo line are designed for warm-water central heating systems with gravity and forced circulation of heating water with the highest operating temperature not exceeding 120 °C and **highest operating overpressure of up to 0.6 MPa. On request** we are able to supply heating bodies with higher operating overpressure **up to 0.8 MPa**. All models manufactured are approved for steam central heating systems with the highest operating overpressure up to 0.07 MPa.

THERMAL AND TECHNICAL PARAMETERS

Table 1 Significant thermal and technical parameters of Termo heating sections

Property	Symbol	Unit	500/95	500/130	623/95	623/130	813/95	813/130
Identification number			27	28	29	30	31	32
Total height	H	(mm)	560	560	683	683	873	873
Spacing	h	(mm)	500	500	623	623	813	813
Depth	B	(mm)	95	130	95	130	95	130
Width	L	(mm)	60	60	60	60	60	60
Connection thread	G	"	1	1	1	1	1	1
Weight	M	(kg/section)	4,35	5,36	5,08	6,46	6,70	8,80
Equivalent heating area	S _L	(m ² / section)	0,192	0,254	0,230	0,303	0,310	0,380
Water volume	V	(dm ³ /)	0,6	0,8	0,8	1,0	1,0	1,3
Thermal power	Q _{Tn}	(W/ section)	73,4	91	88,7	108,8	109,3	136,1
Thermal module	Q _M	(W/m)	1213	1504	1466	1499	1807	2250
Temperature exponent	n	(-)	1,288	1,296	1,316	1,300	1,340	1,316

All Termo models are certified by SZÚ Brno. Thermal and technical parameters are verified experimentally in compliance with EN 442-2.

Tables 2 through to 25 provide values of thermal power for individual models of cast-iron heating bodies for number of sections ranging from 2 up to 30, variable required air temperature and temperature gradient of the heat-transfer fluid (water) equal to 90/70 °C, 75/65 °C, 55/45 °C and steam.

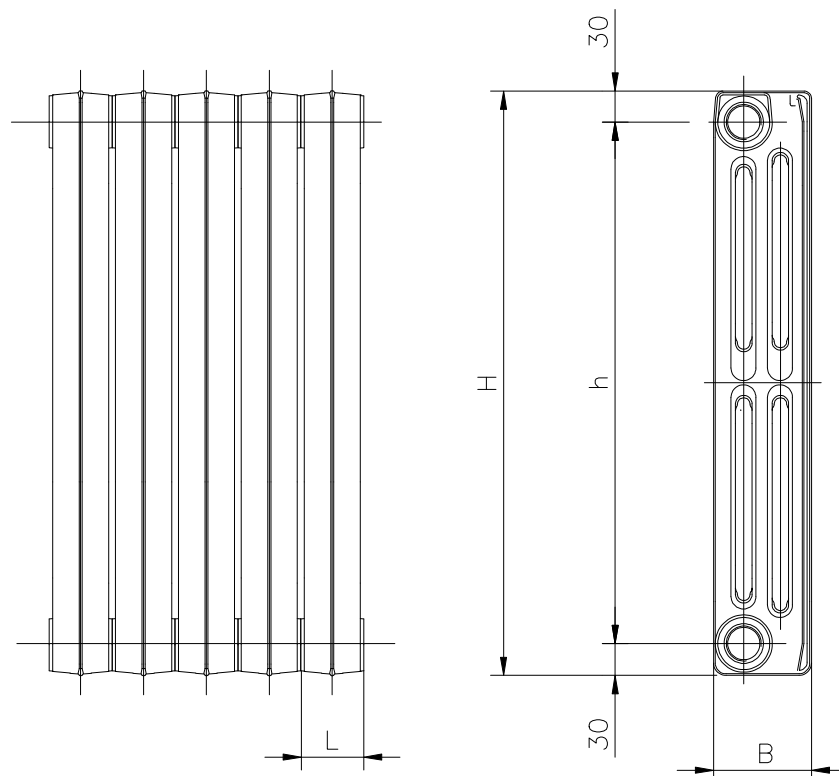


Fig. 2 Standard dimensions of Termo sections

Basic thermal and technical parameters for the heat-transfer fluid – **water** – with the **temperature gradient of 75/65 °C** and one-sided lateral connection (supply) of the heat-transfer fluid (water) at the top are provided in Table 8. Individual models of heating bodies are measured without cover.

TESTING OVERPRESSURE

Units manufactured are subject to the pressure test performed in manufacturer's facility using overpressure of cold water equal to 1 MPa.

ASSEMBLY

In order to achieve required thermal power of individual heating bodies it is necessary to maintain the installation position indicated on Fig. 3. In addition to this a **minimum overlap of window sill** shall be adhered to.

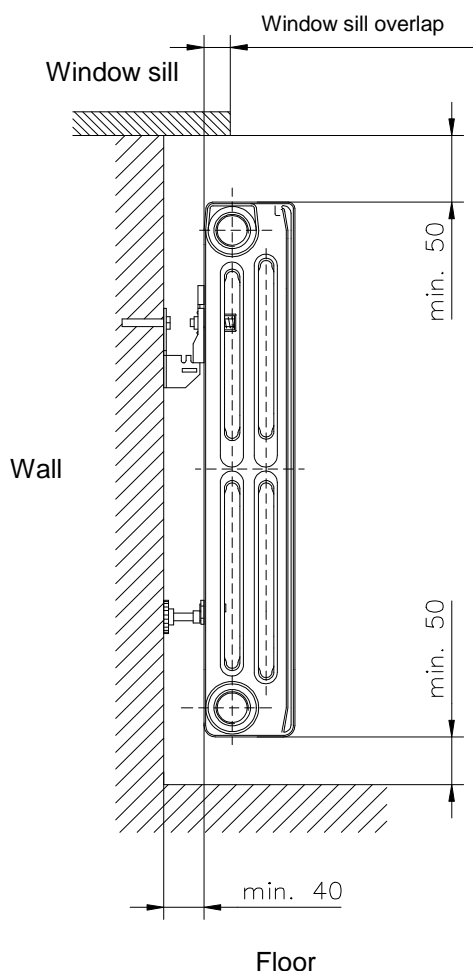


Fig. 3 Installation of Termo heating bodies

Termo heating bodies are connected to the distribution piping using roses provided with external thread G 1" with G 1/8", G 1/4", G 3/8", G 1/2" and G 3/4" bores (**warning: don't use hemp as sealing under these rosettes**).

When facing the front panel surface the bodies are provided on the left side with rose with right-hand thread for connection of the heat-transfer fluid (water) and on the right side with rose with left-hand thread for outlet of the heat-transfer fluid (water) G 1". The upper plug on the opposite side to the connection of the heat-transfer fluid (water) can be provided with bore with eccentrically positioned thread G 1/4" or G 3/8" for the air relief valve. Automatic air relief valves are suitable for this purpose. Prior to combining the individual units supplied into the heating body of required size it is necessary to perform a thorough cleaning of contact surfaces of sections and individual connections shall be sealed by Clingerite, which is normally used during production and it is suitable both for warm-water and steam systems. The sections shall be coupled with the torque of min. 110 Nm and max. 130 Nm. by means of steel nipples.

Gyroscopic moment for tightening of rosettes is from 110 Nm to 130 Nm.

Other installation data are provided in the section of instruction manual common for all models of heating bodies manufactured.

THERMAL POWER TABLES FOR INDIVIDUAL MODELS OF HEATING BODIES

WARM-WATER HEATING

Temperature gradient to EN 442 – 2

Temperature gradients 90/70 °C
 75/65 °C
 55/45 °C

Table 2
Thermal power of heating bodies Termo 500/95 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90\text{ °C}$

$t_{w2} = 70\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	269	244	229	220	210	201
3	378	343	322	309	296	282
4	486	442	415	398	381	364
5	595	540	508	487	466	445
6	704	639	601	576	551	526
7	813	738	694	665	636	608
8	921	837	787	754	721	689
9	1030	935	879	843	806	770
10	1139	1034	972	932	891	852
11	1248	1133	1065	1021	977	933
12	1356	1232	1158	1110	1062	1014
13	1465	1330	1251	1199	1147	1096
14	1574	1429	1344	1288	1232	1177
15	1683	1528	1437	1377	1317	1258
16	1791	1627	1529	1466	1402	1340
17	1900	1725	1622	1555	1487	1421
18	2009	1824	1715	1644	1573	1502
19	2118	1923	1808	1732	1658	1584
20	2226	2022	1901	1821	1743	1665
21	2335	2120	1994	1910	1828	1746
22	2444	2219	2087	1999	1913	1828
23	2553	2318	2180	2088	1998	1909
24	2661	2417	2272	2177	2083	1990
25	2770	2515	2365	2266	2168	2072
26	2879	2614	2458	2355	2254	2153
27	2988	2713	2551	2444	2339	2234
28	3096	2812	2644	2533	2424	2316
29	3205	2910	2737	2622	2509	2397
30	3314	3009	2830	2711	2594	2478

Table 3
Thermal power of heating bodies Termo 500/95 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	220	196	183	173	164	156
3	309	276	256	244	231	219
4	398	355	330	314	298	281
5	487	435	404	384	364	344
6	576	514	478	454	431	407
7	665	594	552	524	497	470
8	754	673	626	594	564	533
9	843	752	699	665	630	596
10	932	832	773	735	697	659
11	1021	911	847	805	763	722
12	1110	991	921	875	830	785
13	1199	1070	995	945	896	848
14	1288	1150	1069	1016	963	911
15	1377	1229	1143	1086	1029	974
16	1466	1309	1216	1156	1096	1037
17	1555	1388	1290	1226	1163	1100
18	1644	1467	1364	1296	1229	1163
19	1732	1547	1438	1366	1296	1226
20	1821	1626	1512	1437	1362	1289
21	1910	1706	1586	1507	1429	1352
22	1999	1785	1660	1577	1495	1415
23	2088	1865	1733	1647	1562	1478
24	2177	1944	1807	1717	1628	1541
25	2266	2024	1881	1787	1695	1604
26	2355	2103	1955	1858	1761	1666
27	2444	2182	2029	1928	1828	1729
28	2533	2262	2103	1998	1895	1792
29	2622	2341	2176	2068	1961	1855
30	2711	2421	2250	2138	2028	1918

Table 4
Thermal power of heating bodies Termo 500/95 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55\text{ °C}$

$t_{w2} = 45\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	130	109	97	89	82	74
3	182	153	136	125	114	104
4	235	197	175	161	147	134
5	287	241	215	197	180	164
6	340	285	254	234	213	194
7	392	330	293	270	246	224
8	445	374	332	306	279	254
9	497	418	372	342	312	284
10	550	462	411	378	345	314
11	602	506	450	414	378	344
12	654	550	489	450	411	374
13	707	594	529	486	444	403
14	759	638	568	522	477	433
15	812	682	607	558	510	463
16	864	726	646	594	543	493
17	917	771	686	630	576	523
18	969	815	725	667	609	553
19	1022	859	764	703	642	583
20	1074	903	803	739	675	613
21	1127	947	843	775	708	643
22	1179	991	882	811	741	673
23	1232	1035	921	847	774	703
24	1284	1079	960	883	807	733
25	1337	1123	1000	919	840	763
26	1389	1167	1039	955	873	793
27	1442	1212	1078	991	906	823
28	1494	1256	1117	1027	939	853
29	1547	1300	1157	1063	972	883
30	1599	1344	1196	1100	1005	913

Table 5
Thermal power of heating bodies Termo 500/130 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90 \text{ }^\circ\text{C}$
 $t_{w2} = 70 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	347	313	293	280	268	255
3	487	440	412	394	376	358
4	627	566	531	507	484	461
5	768	693	649	621	592	564
6	908	820	768	734	701	668
7	1048	947	887	848	809	771
8	1189	1073	1006	961	917	874
9	1329	1200	1124	1075	1026	977
10	1469	1327	1243	1188	1134	1080
11	1610	1453	1362	1301	1242	1183
12	1750	1580	1480	1415	1350	1287
13	1890	1707	1599	1528	1459	1390
14	2031	1833	1718	1642	1567	1493
15	2171	1960	1837	1755	1675	1596
16	2311	2087	1955	1869	1783	1699
17	2452	2214	2074	1982	1892	1802
18	2592	2340	2193	2096	2000	1906
19	2732	2467	2311	2209	2108	2009
20	2873	2594	2430	2323	2217	2112
21	3013	2720	2549	2436	2325	2215
22	3153	2847	2667	2550	2433	2318
23	3294	2974	2786	2663	2541	2421
24	3434	3100	2905	2776	2650	2524
25	3574	3227	3024	2890	2758	2628
26	3715	3354	3142	3003	2866	2731
27	3855	3481	3261	3117	2974	2834
28	3995	3607	3380	3230	3083	2937
29	4136	3734	3498	3344	3191	3040
30	4276	3861	3617	3457	3299	3143

Table 6
Thermal power of heating bodies Termo 500/130 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75 \text{ }^{\circ}\text{C}$
 $t_{w2} = 65 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	280	249	230	218	206	194
3	394	349	323	306	290	273
4	507	450	416	395	373	352
5	621	551	510	483	456	430
6	734	651	603	571	540	509
7	848	752	696	659	623	588
8	961	852	789	747	707	666
9	1075	953	882	836	790	745
10	1188	1054	975	924	873	824
11	1301	1154	1068	1012	957	902
12	1415	1255	1162	1100	1040	981
13	1528	1356	1255	1189	1124	1060
14	1642	1456	1348	1277	1207	1138
15	1755	1557	1441	1365	1290	1217
16	1869	1658	1534	1453	1374	1296
17	1982	1758	1627	1542	1457	1374
18	2096	1859	1720	1630	1541	1453
19	2209	1959	1814	1718	1624	1531
20	2323	2060	1907	1806	1707	1610
21	2436	2161	2000	1895	1791	1689
22	2550	2261	2093	1983	1874	1767
23	2663	2362	2186	2071	1958	1846
24	2776	2463	2279	2159	2041	1925
25	2890	2563	2372	2248	2124	2003
26	3003	2664	2466	2336	2208	2082
27	3117	2764	2559	2424	2291	2161
28	3230	2865	2652	2512	2375	2239
29	3344	2966	2745	2600	2458	2318
30	3457	3066	2838	2689	2542	2397

Table 7**Thermal power of heating bodies Termo 500/130 depending on required air temperature and number of sections****Warm-water heating** **$t_{w1} = 55 \text{ }^{\circ}\text{C}$** **$t_{w2} = 45 \text{ }^{\circ}\text{C}$** ***Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)***

No of sections (n)	10	15	18	20	22	24
2	160	133	118	108	98	89
3	225	187	166	151	138	124
4	290	241	213	195	177	160
5	355	295	261	239	217	196
6	420	349	309	282	257	232
7	485	403	356	326	296	268
8	550	457	404	370	336	303
9	614	511	452	413	376	339
10	679	565	499	457	415	375
11	744	619	547	500	455	411
12	809	673	595	544	495	447
13	874	727	642	588	534	482
14	939	781	690	631	574	518
15	1004	835	738	675	614	554
16	1068	889	785	719	653	590
17	1133	943	833	762	693	626
18	1198	997	881	806	733	662
19	1263	1051	929	849	772	697
20	1328	1105	976	893	812	733
21	1393	1159	1024	937	852	769
22	1458	1213	1072	980	891	805
23	1523	1266	1119	1024	931	841
24	1587	1320	1167	1068	971	876
25	1652	1374	1215	1111	1010	912
26	1717	1428	1262	1155	1050	948
27	1782	1482	1310	1198	1090	984
28	1847	1536	1358	1242	1129	1020
29	1912	1590	1405	1286	1169	1055
30	1977	1644	1453	1329	1209	1091

Table 8
Thermal power of heating bodies Termo 623/95 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90\text{ °C}$
 $t_{w2} = 70\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	345	312	293	280	267	255
3	485	439	411	393	376	358
4	625	565	530	507	484	461
5	765	691	648	620	592	564
6	905	818	767	733	700	667
7	1044	944	885	847	808	771
8	1184	1070	1004	960	917	874
9	1324	1197	1122	1073	1025	977
10	1464	1323	1241	1187	1123	1080
11	1604	1450	1359	1300	1241	1183
12	1743	1576	1478	1413	1349	1286
13	1883	1702	1596	1526	1458	1389
14	2023	1829	1715	1640	1566	1493
15	2163	1955	1833	1753	1674	1596
16	2303	2081	1952	1866	1782	1699
17	2442	2208	2070	1980	1890	1802
18	2582	2334	2189	2093	1999	1905
19	2722	2461	2307	2206	2107	2008
20	2862	2587	2426	2320	2215	2112
21	3002	2713	2544	2433	2323	2215
22	3141	2840	2663	2546	2431	2318
23	3281	2966	2781	2660	2540	2421
24	3421	3092	2900	2773	2648	2524
25	3561	3219	3018	2886	2756	2627
26	3701	3345	3137	2999	2864	2730
27	3840	3471	3255	3113	2972	2834
28	3980	3598	3374	3226	3080	2937
29	4120	3724	3492	3339	3189	3040
30	4260	3851	3610	3453	3297	3143

Table 9
Thermal power of heating bodies Termo 623/95 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75 \text{ }^{\circ}\text{C}$
 $t_{w2} = 65 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	280	249	230	218	207	195
3	393	349	324	307	290	274
4	507	450	417	395	374	353
5	620	551	510	484	457	432
6	733	651	603	572	541	511
7	847	752	697	660	625	589
8	960	853	790	749	708	668
9	1073	953	883	837	792	747
10	1187	1054	976	926	875	826
11	1300	1155	1070	1014	959	905
12	1413	1255	1163	1102	1043	984
13	1526	1356	1256	1191	1126	1063
14	1640	1456	1349	1279	1210	1142
15	1753	1557	1443	1367	1293	1221
16	1866	1658	1536	1456	1377	1299
17	1980	1758	1629	1544	1461	1378
18	2093	1859	1722	1633	1544	1457
19	2206	1960	1815	1721	1628	1536
20	2320	2060	1909	1809	1712	1615
21	2433	2161	2002	1898	1795	1694
22	2546	2262	2095	1986	1879	1773
23	2660	2362	2182	2075	1962	1852
24	2773	2463	2282	2163	2064	1931
25	2886	2564	2375	2251	2130	2010
26	2999	2664	2468	2340	2213	2088
27	3113	2765	2561	2428	2297	2167
28	3226	2865	2655	2516	2380	2246
29	3339	2966	2748	2605	2464	2325
30	3453	3067	2841	2693	2548	2404

Table 10**Thermal power of heating bodies Termo 623/95 depending on required air temperature and number of sections****Warm-water heating** $t_{w1} = 55 \text{ }^{\circ}\text{C}$ $t_{w2} = 45 \text{ }^{\circ}\text{C}$ *Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)*

No of sections (n)	10	15	18	20	22	24
2	161	134	119	109	99	90
3	226	189	167	153	139	126
4	292	243	215	197	179	162
5	357	297	263	241	219	198
6	422	352	311	285	260	235
7	487	406	360	329	300	271
8	552	461	408	373	340	307
9	618	515	456	417	380	343
10	683	569	504	461	420	380
11	748	624	552	506	460	416
12	813	678	600	550	500	452
13	879	732	648	594	540	488
14	944	787	696	638	580	525
15	1009	841	744	682	621	561
16	1074	895	793	726	661	597
17	1139	950	841	770	701	634
18	1205	1004	889	814	741	670
19	1270	1059	937	858	781	706
20	1335	1113	985	902	821	742
21	1400	1167	1033	946	861	779
22	1465	1222	1081	990	901	815
23	1531	1276	1129	1034	942	851
24	1596	1330	1178	1078	982	887
25	1661	1385	1226	1122	1022	924
26	1726	1439	1274	1167	1062	960
27	1792	1494	1322	1211	1102	996
28	1857	1548	1370	1255	1142	1032
29	1922	1602	1418	1299	1182	1069
30	1987	1657	1466	1343	1222	1105

Table 11

Thermal power of heating bodies Termo 623/130 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90\text{ °C}$

$t_{w2} = 70\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	405	367	345	330	316	302
3	569	516	485	464	444	424
4	733	664	624	598	572	546
5	896	813	764	732	700	668
6	1060	962	904	865	828	790
7	1224	1110	1043	999	955	912
8	1388	1259	1183	1133	1083	1034
9	1552	1407	1322	1267	1211	1156
10	1716	1556	1462	1400	1339	1279
11	1879	1705	1602	1534	1467	1401
12	2043	1853	1741	1668	1595	1523
13	2207	2002	1881	1801	1723	1645
14	2371	2150	2021	1935	1851	1767
15	2535	2299	2160	2069	1978	1889
16	2699	2448	2300	2203	2106	2011
17	2863	2596	2439	2336	2234	2133
18	3026	2745	2579	2470	2362	2255
19	3190	2893	2719	2604	2490	2370
20	3354	3042	2858	2737	2618	2500
21	3518	3191	2998	2871	2746	2622
22	3682	3339	3138	3005	2874	2744
23	3846	3488	3277	3139	3002	2866
24	4009	3636	3417	3272	3129	2988
25	4173	3785	3557	3406	3257	3110
26	4337	3934	3696	3540	3385	3232
27	4501	4082	3836	3674	3513	3354
28	4665	4231	3975	3807	3641	3476
29	4829	4379	4115	3941	3769	3599
30	4993	4528	4255	4075	3897	3721

Table 12
Thermal power of heating bodies Termo 623/130 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	330	295	274	260	246	233
3	464	414	384	365	346	327
4	598	533	495	470	446	421
5	732	652	606	575	545	515
6	865	772	717	681	645	610
7	999	891	827	786	745	704
8	1133	1010	938	891	844	798
9	1267	1129	1049	996	944	892
10	1400	1249	1160	1101	1044	987
11	1534	1368	1270	1206	1143	1081
12	1668	1487	1381	1312	1243	1175
13	1801	1606	1492	1417	1342	1269
14	1935	1726	1603	1522	1442	1363
15	2069	1845	1713	1627	1542	1458
16	2203	1964	1824	1732	1641	1552
17	2336	2083	1935	1837	1741	1646
18	2470	2202	2046	1942	1841	1740
19	2604	2322	2156	2048	1940	1835
20	2737	2441	2267	2153	2040	1929
21	2871	2560	2378	2258	2140	2023
22	3005	2679	2489	2363	2239	2117
23	3139	2799	2599	2468	2339	2211
24	3272	2918	2710	2573	2439	2306
25	3406	3037	2821	2679	2538	2400
26	3540	3156	2931	2784	2638	2494
27	3674	3276	3042	2889	2738	2588
28	3807	3395	3153	2994	2837	2683
29	3941	3514	3264	3099	2937	2777
30	4075	3633	3374	3204	3037	2871

Table 13**Thermal power of heating bodies Termo 623/130 depending on required air temperature and number of sections****Warm-water heating** **$t_{w1} = 55 \text{ }^\circ\text{C}$** **$t_{w2} = 45 \text{ }^\circ\text{C}$** ***Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)***

No of sections (n)	10	15	18	20	22	24
2	194	162	144	133	121	110
3	272	228	203	186	170	154
4	350	294	261	240	219	199
5	429	360	320	293	268	243
6	507	425	378	347	317	287
7	586	491	436	401	366	332
8	664	557	495	454	415	376
9	742	623	553	508	464	421
10	821	688	612	562	513	465
11	899	754	670	615	562	510
12	977	820	728	669	611	554
13	1056	885	787	723	660	598
14	1134	951	845	776	709	643
15	1213	1017	904	830	758	687
16	1291	1083	962	884	807	732
17	1369	1148	1020	937	856	776
18	1448	1214	1079	991	905	821
19	1526	1280	1137	1044	954	865
20	1604	1345	1196	1098	1003	909
21	1683	1411	1254	1152	1052	954
22	1761	1477	1312	1205	1101	998
23	1839	1543	1371	1259	1150	1043
24	1918	1608	1429	1313	1199	1087
25	1996	1674	1488	1366	1248	1132
26	2075	1740	1546	1420	1297	1176
27	2153	1806	1604	1474	1346	1220
28	2231	1871	1663	1527	1395	1265
29	2310	1937	1721	1581	1444	1309
30	2388	2003	1780	1635	1493	1354

Table 14**Thermal power of heating bodies Termo 813/95 depending on required air temperature and number of sections****Warm-water heating** **$t_{w1} = 90\text{ °C}$** **$t_{w2} = 70\text{ °C}$** ***Thermal power Q (W) at air temperature of t_i (°C)***

No of sections (n)	10	15	18	20	22	24
2	413	374	351	336	321	307
3	580	525	493	472	451	431
4	747	677	635	608	581	555
5	914	828	777	744	711	679
6	1081	979	919	880	841	803
7	1247	1130	1062	1016	971	927
8	1414	1282	1204	1152	1102	1051
9	1581	1433	1346	1288	1232	1175
10	1748	1584	1488	1424	1362	1300
11	1915	1736	1630	1560	1492	1424
12	2082	1887	1772	1696	1622	1548
13	2249	2038	1914	1832	1752	1672
14	2416	2190	2056	1968	1882	1796
15	2583	2341	2198	2104	2012	1920
16	2750	2492	2340	2241	2142	2044
17	2917	2643	2482	2377	2272	2168
18	3084	2795	2625	2513	2402	2292
19	3251	2946	2767	2649	2532	2416
20	3418	3097	2909	2785	2662	2441
21	3585	3249	3051	2921	2792	2665
22	3752	3400	3193	3057	2922	2789
23	3919	3551	3335	3193	3052	2913
24	4086	3703	3477	3329	3182	3037
25	4253	3854	3619	3465	3312	3161
26	4420	4005	3761	3601	3442	3285
27	4587	4156	3903	3737	3572	3409
28	4754	4308	4045	3873	3702	3533
29	4921	4459	4188	4009	3832	3657
30	5088	4610	4330	4145	3962	3782

Table 15

Thermal power of heating bodies Termo 813/95 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	336	299	278	264	250	236
3	472	421	390	371	351	332
4	608	542	503	477	452	427
5	744	663	615	584	553	523
6	880	784	728	691	654	618
7	1016	905	840	797	755	714
8	1152	1026	953	904	856	809
9	1288	1148	1065	1011	958	905
10	1424	1269	1178	1118	1059	1000
11	1560	1390	1290	1224	1160	1096
12	1696	1511	1402	1331	1261	1191
13	1832	1632	1515	1438	1362	1287
14	1968	1753	1627	1545	1463	1383
15	2104	1875	1740	1651	1564	1478
16	2241	1996	1852	1758	1665	1574
17	2377	2117	1965	1865	1766	1669
18	2513	2238	2077	1972	1867	1765
19	2649	2359	2190	2078	1969	1860
20	2785	2480	2302	2185	2070	1956
21	2921	2602	2415	2292	2171	2051
22	3057	2723	2527	2399	2272	2147
23	3193	2844	2639	2505	2373	2242
24	3329	2965	2752	2612	2474	2338
25	3465	3086	2864	2719	2575	2434
26	3601	3207	2977	2826	2676	2529
27	3737	3329	3089	2932	2777	2625
28	3873	3450	3202	3039	2879	2720
29	4009	3571	3314	3146	2980	2816
30	4145	3692	3427	3253	3081	2911

Table 16
Thermal power of heating bodies Termo 813/95 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55\text{ °C}$

$t_{w2} = 45\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No. of sections (n)	10	15	18	20	22	24
2	196	164	146	134	122	111
3	275	231	205	188	171	155
4	355	297	264	242	221	200
5	434	363	323	296	270	245
6	513	430	382	350	320	290
7	595	496	441	404	369	334
8	672	563	500	458	418	379
9	751	629	558	513	468	424
10	831	696	617	567	517	468
11	910	762	676	621	566	513
12	989	828	735	675	616	558
13	1069	895	794	729	665	603
14	1148	961	853	783	715	647
15	1227	1028	912	837	764	692
16	1307	1094	971	891	813	737
17	1386	1161	1030	946	863	782
18	1465	1227	1089	1000	912	826
19	1545	1293	1148	1054	961	871
20	1624	1360	1207	1108	1011	916
21	1703	1426	1266	1162	1060	961
22	1783	1493	1325	1216	1110	1005
23	1862	1559	1384	1270	1159	1050
24	1941	1626	1443	1324	1208	1095
25	2021	1692	1502	1378	1258	1140
26	2100	1758	1561	1433	1307	1184
27	2179	1825	1620	1487	1356	1229
28	2259	1891	1679	1541	1406	1274
29	2338	1958	1738	1595	1455	1319
30	2417	2024	1797	1649	1504	1363

Table 17

Thermal power of heating bodies Termo 813/130 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90\text{ °C}$

$t_{w2} = 70\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No. of sections (n)	10	15	18	20	22	24
2	510	462	433	414	396	377
3	717	649	608	582	556	530
4	923	835	784	750	716	683
5	1130	1022	959	917	876	836
6	1336	1209	1134	1085	1036	988
7	1543	1396	1309	1253	1197	1141
8	1750	1583	1485	1420	1357	1294
9	1956	1770	1660	1588	1517	1447
10	2163	1956	1835	1756	1677	1599
11	2369	2143	2011	1923	1837	1752
12	2576	2330	2186	2091	1997	1905
13	2782	2517	2361	2259	2158	2058
14	2989	2704	2536	2426	2318	2210
15	3195	2891	2712	2594	2478	2363
16	3402	3077	2887	2762	2638	2516
17	3608	3264	3062	2929	2798	2669
18	3815	3451	3237	3097	2958	2821
19	4021	3638	3413	3265	3118	2974
20	4228	3825	3588	3432	3279	3127
21	4434	4012	3763	3600	3439	3279
22	4641	4198	3939	3768	3599	3432
23	4847	4385	4114	3935	3759	3585
24	5054	4572	4289	4103	3919	3738
25	5260	4759	4464	4271	4079	3890
26	5467	4946	4640	4438	4240	4043
27	5673	5133	4815	4606	4400	4196
28	5880	5319	4990	4774	4560	4349
29	6087	5506	5165	4941	4720	4501
30	6293	5693	5341	5109	4880	4654

Table 18**Thermal power of heating bodies Termo 813/130 depending on required air temperature and number of sections****Warm-water heating** **$t_{w1} = 75 \text{ }^\circ\text{C}$** **$t_{w2} = 65 \text{ }^\circ\text{C}$** ***Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)***

No. of sections (n)	10	15	18	20	22	24
2	414	368	341	324	306	289
3	582	517	480	455	430	406
4	750	666	618	586	554	523
5	917	816	756	717	678	641
6	1085	965	894	848	802	758
7	1253	1114	1032	979	926	875
8	1420	1263	1171	1110	1050	992
9	1588	1412	1309	1241	1174	1109
10	1756	1561	1447	1372	1298	1226
11	1923	1710	1585	1503	1422	1343
12	2091	1859	1723	1634	1546	1460
13	2259	2008	1861	1765	1670	1577
14	2426	2157	2000	1896	1794	1694
15	2594	2306	2138	2027	1918	1811
16	2762	2455	2276	2158	2042	1928
17	2929	2604	2414	2289	2166	2045
18	3097	2753	2552	2420	2291	2162
19	3265	2902	2690	2552	2415	2279
20	3432	3051	2829	2683	2539	2397
21	3600	3201	2967	2814	2663	2514
22	3768	3350	3105	2945	2787	2631
23	3935	3499	3243	3076	2911	2748
24	4103	3648	3381	3207	3035	2865
25	4271	3797	3520	3338	3159	2982
26	4438	3946	3658	3469	3283	3099
27	4606	4095	3796	3600	3407	3216
28	4774	4244	3934	3731	3531	3333
29	4941	4393	4072	3862	3655	3450
30	5109	4542	4210	3993	3779	3567

Table 19**Thermal power of heating bodies Termo 813/130 depending on required air temperature and number of sections****Warm-water heating** **$t_{w1} = 55 \text{ }^{\circ}\text{C}$** **$t_{w2} = 45 \text{ }^{\circ}\text{C}$** ***Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)***

No. of sections (n)	10	15	18	20	22	24
2	239	200	177	162	148	134
3	336	281	249	228	208	188
4	433	362	320	294	268	242
5	530	443	392	359	327	296
6	627	524	464	425	387	350
7	724	604	535	491	447	404
8	821	685	607	556	507	459
9	918	766	679	622	567	513
10	1015	847	751	688	627	567
11	1112	928	822	753	686	621
12	1209	1009	894	819	746	675
13	1306	1090	966	885	806	729
14	1402	1171	1037	951	866	783
15	1499	1252	1109	1016	926	837
16	1596	1333	1181	1082	986	892
17	1693	1414	1252	1148	1045	946
18	1790	1494	1324	1213	1105	1000
19	1887	1575	1396	1279	1165	1054
20	1984	1656	1467	1345	1225	1108
21	2081	1737	1539	1410	1285	1162
22	2178	1818	1611	1476	1345	1216
23	2275	1899	1682	1542	1404	1271
24	2372	1980	1754	1607	1464	1325
25	2468	2061	1826	1673	1524	1379
26	2565	2142	1897	1739	1584	1433
27	2662	2223	1969	1804	1644	1487
28	2759	2303	2041	1870	1704	1541
29	2856	2384	2112	1936	1763	1595
30	2953	2465	2184	2001	1823	1649

STEAM HEATING

Steam condensation temperature $t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Table 20**Thermal power of heating bodies Termo 500/95 depending on required air temperature and number of sections****Steam heating** **$t_{pk} = 101,5 \text{ }^{\circ}\text{C}$** ***Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)***

No. of sections (n)	10	15	18	20	22	24
2	403	374	358	346	335	324
3	566	526	502	487	471	456
4	729	677	647	627	607	587
5	892	829	792	767	743	718
6	1055	980	936	907	878	850
7	1218	1132	1081	1047	1014	981
8	1381	1283	1226	1188	1150	1112
9	1544	1435	1370	1328	1285	1244
10	1707	1586	1515	1468	1421	1375
11	1870	1738	1660	1608	1557	1506
12	2033	1889	1804	1748	1693	1637
13	2196	2041	1949	1888	1828	1769
14	2359	2192	2094	2029	1964	1900
15	2522	2344	2238	2169	2100	2031
16	2685	2495	2383	2309	2236	2163
17	2848	2647	2528	2449	2371	2294
18	3011	2798	2672	2589	2507	2425
19	3174	2950	2817	2730	2643	2556
20	3337	3101	2962	2870	2778	2688
21	3500	3253	3107	3010	2914	2819
22	3663	3404	3251	3150	3050	2950
23	3826	3556	3396	3290	3186	3082
24	3989	3707	3541	3431	3321	3213
25	4151	3859	3685	3571	3457	3344
26	4314	4010	3830	3711	3593	3476
27	4477	4162	3975	3851	3729	3607
28	4640	4313	4119	3991	3864	3738
29	4803	4465	4264	4131	4000	3869
30	4966	4616	4409	4272	4136	4001

Table 21
Thermal power of heating bodies Termo 500/130 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	531	491	468	452	437	422
3	745	690	657	635	614	593
4	960	888	846	818	791	763
5	1175	1087	1035	1001	968	934
6	1389	1286	1225	1184	1144	1105
7	1604	1484	1414	1367	1321	1276
8	1819	1683	1603	1550	1498	1446
9	2033	1882	1792	1733	1675	1617
10	2248	2080	1981	1916	1852	1788
11	2463	2279	2171	2099	2029	1959
12	2677	2478	2360	2282	2205	2129
13	2892	2676	2549	2465	2382	2300
14	3107	2875	2738	2648	2559	2471
15	3321	3074	2928	2831	2736	2642
16	3536	3272	3117	3014	2913	2812
17	3751	3471	3306	3197	3090	2983
18	3965	3670	3495	3380	3267	3154
19	4180	3868	3685	3563	3443	3325
20	4395	4067	3874	3746	3620	3495
21	4609	4266	4063	3929	3797	3666
22	4824	4464	4252	4112	3974	3837
23	5039	4663	4442	4295	4151	4008
24	5253	4862	4631	4478	4328	4178
25	5468	5060	4820	4662	4505	4349
26	5683	5259	5009	4845	4681	4520
27	5897	5458	5198	5028	4858	4690
28	6112	5656	5388	5211	5035	4861
29	6327	5855	5577	5394	5212	5032
30	6541	6054	5766	5577	5389	5203

Table 22

Thermal power of heating bodies Termo 623/95 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	526	487	465	449	434	420
3	739	685	652	631	610	589
4	952	882	840	813	786	759
5	1165	1079	1028	995	962	929
6	1378	1276	1216	1177	1138	1099
7	1591	1474	1404	1359	1313	1269
8	1804	1671	1592	1541	1489	1438
9	2017	1868	1780	1722	1665	1608
10	2230	2065	1968	1904	1841	1778
11	2442	2262	2156	2086	2017	1948
12	2655	2460	2344	2268	2193	2118
13	2868	2657	2532	2450	2368	2288
14	3081	2854	2720	2632	2544	2457
15	3294	3051	2908	2814	2720	2627
16	3507	3249	3096	2995	2896	2797
17	3720	3446	3284	3177	3072	2967
18	3933	3643	3472	3359	3247	3137
19	4146	3840	3660	3541	3423	3306
20	4359	4037	3848	3723	3599	3476
21	4572	4235	4036	3905	3775	3646
22	4785	4432	4224	4087	3951	3816
23	4998	4629	4412	4268	4126	3986
24	5210	4826	4600	4450	4302	4155
25	5423	5024	4788	4632	4478	4325
26	5636	5221	4976	4814	4654	4495
27	5849	5418	5164	4996	4830	4665
28	6062	5615	5352	5178	5005	4835
29	6275	5813	5540	5360	5181	5004
30	6488	6010	5728	5541	5357	5174

Table 23

Thermal power of heating bodies Termo 623/130 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	609	566	540	523	506	490
3	856	795	759	735	711	688
4	1103	1024	977	947	916	886
5	1349	1253	1196	1158	1121	1084
6	1596	1482	1414	1370	1326	1282
7	1842	1711	1633	1582	1531	1480
8	2089	1940	1852	1793	1736	1678
9	2335	2169	2070	2005	1940	1876
10	2582	2398	2289	2217	2145	2075
11	2829	2627	2507	2428	2350	2273
12	3075	2856	2726	2640	2555	2471
13	3322	3085	2944	2852	2760	2669
14	3568	3314	3163	3064	2965	2867
15	3815	3543	3382	3275	3170	3065
16	4062	3772	3600	3487	3375	3263
17	4308	4001	3819	3699	3580	3461
18	4555	4230	4037	3910	3784	3659
19	4801	4459	4256	4122	3989	3858
20	5048	4688	4474	4334	4194	4056
21	5294	4917	4693	4546	4399	4254
22	5541	5146	4912	4757	4604	4452
23	5788	5374	5130	4969	4809	4650
24	6034	5603	5349	5181	5014	4848
25	6281	5832	5567	5392	5219	5046
26	6527	6061	5786	5604	5424	5244
27	6774	6290	6005	5816	5628	5443
28	7021	6519	6223	6027	5833	5641
29	7267	6748	6442	6239	6038	5839
30	7514	6977	6660	6451	6243	6037

Table 24

Thermal power of heating bodies Termo 813/130 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	775	718	685	663	641	619
3	1089	1009	962	931	900	870
4	1402	1300	1239	1199	1160	1120
5	1716	1591	1516	1468	1419	1371
6	2030	1881	1794	1736	1678	1622
7	2344	2172	2071	2004	1938	1872
8	2657	2463	2348	2272	2197	2123
9	2971	2754	2625	2541	2457	2373
10	3285	3044	2902	2809	2716	2624
11	3598	3335	3180	3077	2975	2875
12	3912	3626	3457	3345	3235	3125
13	4226	3916	3734	3614	3494	3376
14	4539	4207	4011	3882	3754	3626
15	4853	4498	4288	4150	4013	3877
16	5167	4789	4565	4418	4272	4128
17	5480	5079	4843	4686	4532	4378
18	5794	5370	5120	4955	4791	4629
19	6108	5661	5397	5223	5050	4879
20	6421	5951	5674	5491	5310	5130
21	6735	6242	5951	5759	5569	5381
22	7049	6533	6228	6028	5829	5631
23	7362	6824	6506	6296	6088	5882
24	7676	7114	6783	6564	6347	6132
25	7990	7405	7060	6832	6607	6383
26	8303	7696	7337	7101	6866	6634
27	8617	7987	7614	7369	7125	6884
28	8931	8277	7892	7637	7385	7135
29	9244	8568	8169	7905	7644	7385
30	9558	8859	8446	8174	7904	7636

Table 25

Thermal power of heating bodies Termo 813/95 depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	623	578	552	534	517	500
3	875	812	775	750	726	702
4	1127	1046	998	966	935	904
5	1379	1280	1221	1183	1144	1106
6	1631	1514	1444	1399	1353	1308
7	1883	1748	1668	1615	1562	1510
8	2136	1982	1891	1831	1771	1712
9	2388	2216	2114	2047	1981	1915
10	2640	2450	2337	2263	2190	2117
11	2892	2684	2561	2479	2399	2319
12	3144	2918	2784	2695	2608	2521
13	3396	3151	3007	2912	2817	2723
14	3648	3385	3230	3128	3026	2925
15	3900	3619	3453	3344	3235	3127
16	4152	3853	3677	3560	3444	3330
17	4404	4087	3900	3776	3653	3532
18	4656	4321	4123	3992	3863	3734
19	4909	4555	4346	4208	4072	3936
20	5161	4789	4569	4425	4281	4138
21	5413	5023	4793	4641	4490	4340
22	5665	5257	5016	4857	4699	4542
23	5917	5491	5239	5073	4908	4745
24	6169	5725	5462	5289	5117	4947
25	6421	5959	5686	5505	5326	5149
26	6673	6193	5909	5721	5535	5351
27	6925	6427	6132	5937	5744	5553
28	7177	6661	6355	6154	5954	5755
29	7429	6895	6578	6370	6163	5957
30	7682	7128	6802	6586	6372	6160

CAST-IRON HEATING BODIES

BOHEMIA

BOHEMIA

DESCRIPTION

Cast-iron heating body consisting of sections connected into heating systems using steel nipples with external right-hand or left-hand thread G 5/4" is manufactured in the following size: **450/220 mm and 800/220 mm**. Heating bodies material complies with EN 442–1 amendment A1 (grey cast-iron to EN 1561, grade 150). The design of castings ensures a long life cycle of products.

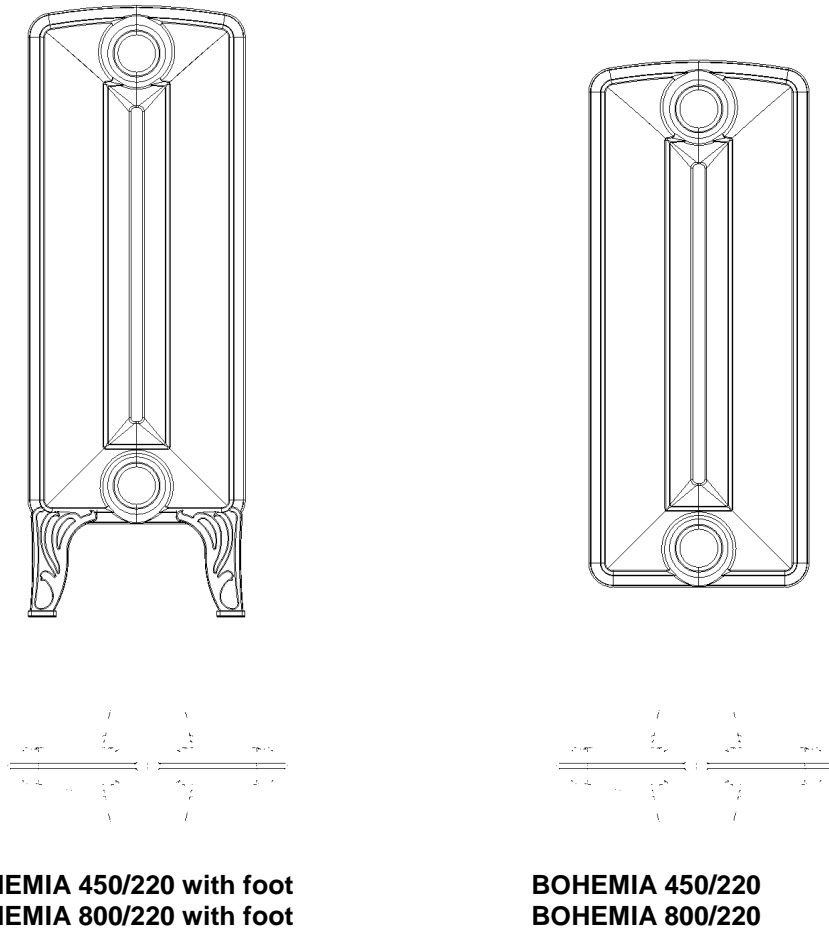


Fig. 1 BOHEMIA type heating body

USAGE

BOHEMIA heating body is designed for warm-water central heating systems with gravity and forced circulation of heating water with the highest operating temperature not exceeding 115 °C and highest operating overpressure of up to 0.6 MPa. With its design the body is suitable for historical buildings and stylish interiors. In addition to this all models manufactured are approved for steam central heating systems with the maximum operating overpressure of up to 0.07 MPa.

THERMAL AND TECHNICAL PARAMETERS

BOHEMIA type is certified by SZÚ Brno. Thermal and technical parameters for the heat-transfer fluid (water) have been verified experimentally in compliance with EN 442-2 in the Measuring laboratory of Technical University in DARMSTADT.

Basic thermal and technical parameters are provided in Table 1. Indicated thermal power applies to the heat-transfer fluid (water) with the temperature gradient of 75/65 °C and one-sided lateral connection (supply) of the heat-transfer fluid (water) at the top. The body is measured without cover.

Environment: These heating bodies can be used in the following temperature range: +2 °C up to +35 °C.

Table 1 Significant thermal and technical parameters of BOHEMIA heating sections

Property	Symbol	450/220	450/220 with foot	800/220	800/220 with foot
Identification		33	34	69	70
Total height	H (mm)	540	640	890	990
Spacing	h (mm)	450	450	800	800
Depth	B (mm)	225	225	225	225
Width	L (mm)	86	86	86	86
Connection thread	G	5/4	5/4	5/4	5/4
Weight	M (kg/pc.)	9,9	11,4	16,27	17,54
Water volume	V (dm ³ /pc.)	2,4	2,4	4,2	4,2
Thermal power	Q _{Tn} (W/section)	110	110	169	169
Heat exponent	n	1,2880	1,2880	1,3002	1,3002

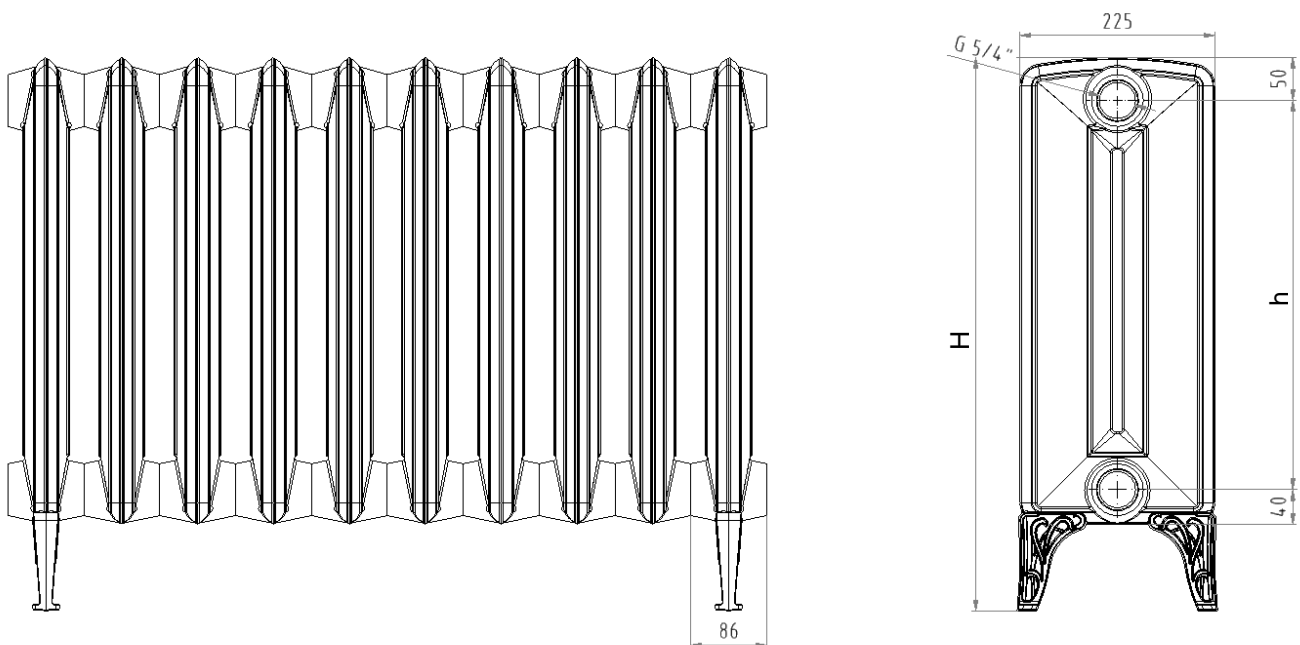


Fig. 2 Standard dimensions of BOHEMIA sections

TESTING OVERPRESSURE

Units manufactured are subject to the pressure test performed in manufacturer's facility using overpressure of cold water equal to 1 MPa.

ASSEMBLY

In order to achieve required thermal power of heating bodies it is necessary to maintain the installation position indicated on Fig. 3.

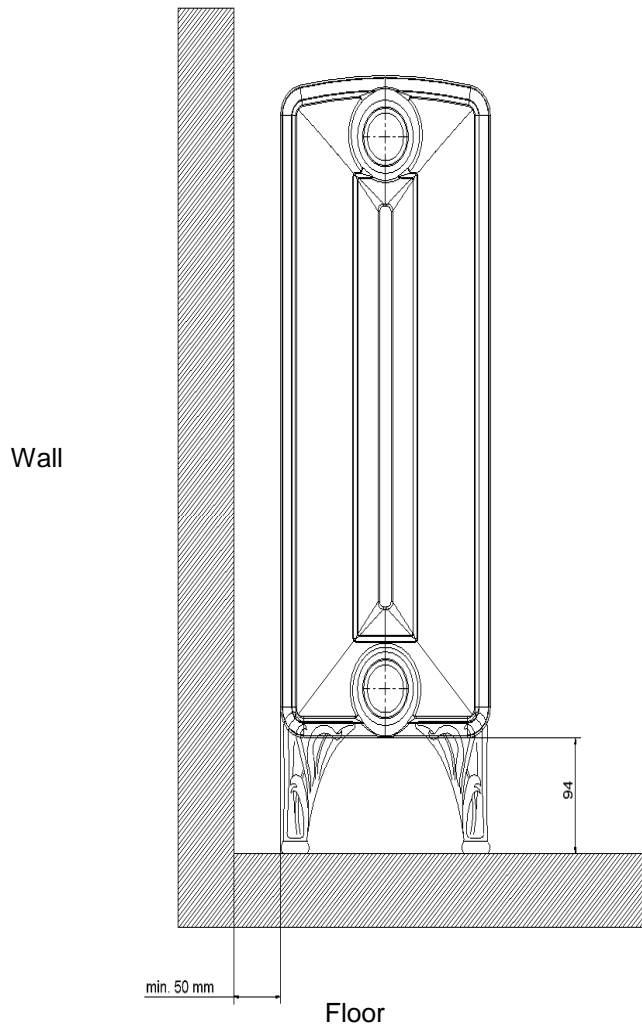


Fig. 3 Installation of BOHEMIA heating bodies

BOHEMIA heating bodies are connected to the distribution piping using roses provided with external thread G 5/4" with G 3/8", G 1/2", G 3/4" and G 1" bores (**warning: don't use hemp as sealing under these rosettes**).

Openings of the heating body on the opposite side to connection are terminated by solid plugs provided with external left-hand thread G 5/4". The upper plug can be provided with bore with eccentrically positioned thread G 1/4" for the air relief valve. Automatic air relief valves are suitable for this purpose.

Prior to combining the individual units supplied it is necessary to perform a thorough cleaning of contact surfaces of sections and connections should be sealed by TEMASIL packing, which is normally used during production and it is suitable both for warm-water and steam systems. The sections shall be coupled with the torque of min. 130 Nm and max. 150 Nm. by means of steel nipples.

Gyroscopic moment for tightening of rosettes is from 130 Nm to 150 Nm.

Other installation data are provided in the section of instruction manual common for all models of heating bodies manufactured.

Table 2 Number of elements BOHEMIA with foot

Dimensions of sections (mm)	Number of elements									
	3	4	6	8	10	11	13	15	17	19
BOHEMIA 450/220 with foot	2					3				
BOHEMIA 800/220 with foot	2				3			4		

THERMAL POWER TABLES FOR INDIVIDUAL MODELS OF HEATING BODIES

WARM-WATER HEATING

Temperature gradient to EN 442 – 2

Temperature gradients 90/70 °C
 75/65 °C
 55/45 °C

Table 3
Thermal power of heating bodies Bohemia 450/220, h = 450 mm depending on
required air temperature and number of sections

Warm-water heating

$t_{w1} = 90 \text{ }^\circ\text{C}$

$t_{w2} = 70 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	416	375	351	335	320	305
3	584	527	493	471	449	428
4	752	678	635	607	579	551
5	920	830	777	743	708	675
6	1088	982	919	878	838	798
7	1257	1134	1061	1014	967	921
8	1425	1285	1203	1150	1097	1045
9	1593	1437	1346	1286	1226	1168
10	1761	1589	1488	1421	1356	1291
11	1929	1740	1630	1557	1485	1415
12	2098	1892	1772	1693	1615	1538
13	2266	2044	1914	1828	1744	1661
14	2434	2196	2056	1964	1874	1784
15	2602	2347	2198	2100	2003	1908
16	2770	2499	2340	2236	2133	2031
17	2938	2651	2482	2371	2262	2154
18	3107	2802	2624	2507	2392	2278
19	3275	2954	2766	2643	2521	2401
20	3443	3106	2908	2779	2651	2524
21	3611	3258	3050	2914	2780	2648
22	3779	3409	3192	3050	2910	2771
23	3948	3561	3334	3186	3039	2894
24	4116	3713	3477	3322	3169	3018
25	4284	3864	3619	3457	3298	3141
26	4452	4016	3761	3593	3428	3264
27	4620	4168	3903	3729	3557	3388
28	4789	4320	4045	3864	3686	3511
29	4957	4471	4187	4000	3816	3634
30	5125	4623	4329	4136	3945	3758

Table 4
Thermal power of heating bodies Bohemia 450/220, h = 450 mm depending on
required air temperature and number of sections

Warm-water heating

$t_{w1} = 75\text{ °C}$

$t_{w2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No. of sections (n)	10	15	18	20	22	24
2	335	297	275	260	246	232
3	471	417	386	366	345	326
4	607	538	497	471	445	419
5	743	658	609	576	544	513
6	878	778	720	682	644	607
7	1014	898	831	787	744	701
8	1150	1019	942	892	843	795
9	1286	1139	1054	998	943	888
10	1421	1259	1165	1103	1042	982
11	1557	1380	1276	1208	1142	1076
12	1693	1500	1387	1314	1241	1170
13	1828	1620	1498	1419	1341	1264
14	1964	1740	1610	1524	1440	1357
15	2100	1861	1721	1630	1540	1451
16	2236	1981	1832	1735	1639	1545
17	2371	2101	1943	1840	1739	1639
18	2507	2221	2055	1946	1838	1733
19	2643	2342	2166	2051	1938	1826
20	2779	2462	2277	2156	2037	1920
21	2914	2582	2388	2262	2137	2014
22	3050	2702	2500	2367	2236	2108
23	3186	2823	2611	2472	2336	2202
24	3322	2943	2722	2578	2435	2295
25	3457	3063	2833	2683	2535	2389
26	3593	3183	2945	2788	2634	2483
27	3729	3304	3056	2894	2734	2577
28	3864	3424	3167	2999	2833	2670
29	4000	3544	3278	3104	2933	2764
30	4136	3665	3389	3210	3032	2858

Table 5
Thermal power of heating bodies Bohemia 450/220, h = 450 mm depending on
required air temperature and number of sections

Warm-water heating

$t_{w1} = 55\text{ °C}$

$t_{w2} = 45\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No. of sections (n)	10	15	18	20	22	24
2	191	158	140	128	116	105
3	268	223	197	180	163	147
4	345	287	253	231	210	190
5	423	351	310	283	257	232
6	500	415	366	335	304	274
7	577	479	423	387	351	317
8	654	543	480	438	398	359
9	731	607	536	490	445	402
10	809	672	593	542	492	444
11	886	736	649	594	539	487
12	963	800	706	645	586	529
13	1040	864	763	697	633	571
14	1118	928	819	749	680	614
15	1195	992	876	801	727	656
16	1272	1056	933	853	775	699
17	1349	1121	989	904	822	741
18	1426	1185	1046	956	869	783
19	1504	1249	1102	1008	916	826
20	1581	1313	1159	1060	963	868
21	1658	1377	1216	1111	1010	911
22	1735	1441	1272	1163	1057	953
23	1813	1505	1329	1215	1104	996
24	1890	1569	1386	1267	1151	1038
25	1967	1634	1442	1318	1198	1080
26	2044	1698	1499	1370	1245	1123
27	2121	1762	1555	1422	1292	1165
28	2199	1826	1612	1474	1339	1208
29	2276	1890	1669	1525	1386	1250
30	2353	1954	1725	1577	1433	1293

Table 6

Thermal power of heating bodies BOHEMIA 800/220, h= 800 mm depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 90\text{ °C}$

$t_{W2} = 70\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No. of sections (n)	10	15	18	20	22	24
2	605	549	517	495	474	448
3	850	772	726	695	665	630
4	1094	994	935	896	857	811
5	1339	1216	1144	1096	1049	992
6	1584	1438	1353	1296	1240	1174
7	1829	1661	1562	1497	1432	1355
8	2074	1883	1771	1697	1624	1536
9	2318	2105	1980	1897	1815	1718
10	2563	2328	2189	2098	2007	1899
11	2808	2550	2398	2298	2199	2081
12	3053	2772	2607	2498	2391	2262
13	3297	2995	2816	2699	2582	2443
14	3542	3217	3025	2899	2774	2625
15	3787	3439	3234	3099	2966	2806
16	4032	3661	3443	3300	3157	2987
17	4277	3884	3652	3500	3349	3169
18	4521	4106	3861	3700	3541	3350
19	4766	4328	4070	3900	3732	3532
20	5011	4551	4279	4101	3924	3713
21	5256	4773	4488	4301	4116	3894
22	5500	4995	4697	4501	4307	4076
23	5745	5217	4907	4702	4499	4257
24	5990	5440	5116	4902	4691	4438
25	6235	5662	5325	5102	4882	4620
26	6480	5884	5534	5303	5074	4801
27	6724	6107	5743	5503	5266	4982
28	6969	6329	5952	5703	5457	5164
29	7214	6551	6161	5904	5649	5345
30	7459	6773	6370	6104	5841	5527

Table 7

Thermal power of heating bodies BOHEMIA 800/220, h= 800 mm depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75 \text{ }^\circ\text{C}$

$t_{w2} = 65 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	495	442	411	391	370	350
3	695	621	577	549	520	492
4	896	800	744	707	670	634
5	1096	979	910	865	820	776
6	1296	1158	1076	1023	970	918
7	1497	1337	1243	1181	1120	1059
8	1697	1515	1409	1339	1270	1201
9	1897	1694	1575	1497	1419	1343
10	2098	1873	1741	1655	1569	1485
11	2298	2052	1908	1813	1719	1627
12	2498	2231	2074	1971	1869	1768
13	2699	2410	2240	2129	2019	1910
14	2899	2589	2407	2287	2169	2052
15	3099	2768	2573	2445	2319	2194
16	3300	2947	2739	2603	2469	2336
17	3500	3125	2906	2761	2618	2477
18	3700	3304	3072	2919	2768	2619
19	3900	3483	3238	3077	2918	2761
20	4101	3662	3405	3235	3068	2903
21	4301	3841	3571	3393	3218	3045
22	4501	4020	3737	3551	3368	3187
23	4702	4199	3904	3709	3518	3328
24	4902	4378	4070	3867	3668	3470
25	5102	4557	4236	4026	3817	3612
26	5303	4735	4402	4184	3967	3754
27	5503	4914	4569	4342	4117	3896
28	5703	5093	4735	4500	4267	4037
29	5904	5272	4901	4658	4417	4179
30	6104	5451	5068	4816	4567	4321

Table 8

Thermal power of heating bodies BOHEMIA 800/220, h= 800 mm depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55 \text{ }^\circ\text{C}$

$t_{w2} = 45 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	292	246	219	201	182	165
3	410	345	307	282	256	232
4	529	444	396	364	329	298
5	647	544	484	445	403	365
6	765	643	572	526	477	432
7	883	743	661	608	550	499
8	1002	842	749	689	624	565
9	1120	941	838	770	698	632
10	1238	1041	926	852	771	699
11	1356	1140	1015	933	845	765
12	1475	1240	1103	1014	918	832
13	1593	1339	1192	1096	992	899
14	1711	1438	1280	1177	1066	966
15	1829	1538	1369	1258	1139	1032
16	1948	1637	1457	1340	1213	1099
17	2066	1737	1546	1421	1287	1166
18	2184	1836	1634	1503	1360	1233
19	2302	1935	1723	1584	1434	1299
20	2421	2035	1811	1665	1508	1366
21	2539	2134	1899	1747	1581	1433
22	2657	2234	1988	1828	1655	1500
23	2775	2333	2076	1909	1729	1566
24	2894	2432	2165	1991	1802	1633
25	3012	2532	2253	2072	1876	1700
26	3130	2631	2342	2153	1950	1766
27	3248	2731	2430	2235	2023	1833
28	3366	2830	2519	2316	2097	1900
29	3485	2929	2607	2397	2171	1967
30	3603	3029	2696	2479	2244	2033

STEAM HEATING

Steam condensation temperature $t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Table 9
Thermal power of heating bodies Bohemia 450/220, h = 450 mm depending on
required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	638	590	562	543	525	506
3	896	829	789	763	737	711
4	1154	1067	1016	983	949	916
5	1412	1306	1244	1202	1161	1121
6	1670	1545	1471	1422	1374	1326
7	1929	1784	1698	1642	1586	1531
8	2187	2022	1925	1862	1798	1736
9	2445	2261	2153	2081	2011	1941
10	2703	2500	2380	2301	2223	2145
11	2961	2738	2607	2521	2435	2350
12	3219	2977	2835	2741	2647	2555
13	3477	3216	3062	2960	2860	2760
14	3735	3455	3289	3180	3072	2965
15	3994	3693	3516	3400	3284	3170
16	4252	3932	3744	3620	3497	3375
17	4510	4171	3971	3839	3709	3580
18	4768	4409	4198	4059	3921	3785
19	5026	4648	4425	4279	4133	3989
20	5284	4887	4653	4498	4346	4194
21	5542	5126	4880	4718	4558	4399
22	5800	5364	5107	4938	4770	4604
23	6059	5603	5335	5158	4983	4809
24	6317	5842	5562	5377	5195	5014
25	6575	6081	5789	5597	5407	5219
26	6833	6319	6016	5817	5619	5424
27	7091	6558	6244	6037	5832	5629
28	7349	6797	6471	6256	6044	5834
29	7607	7035	6698	6476	6256	6038
30	7865	7274	6926	6696	6469	6243

Table 10

Thermal power of heating bodies BOHEMIA 800/220, h = 800 mm depending on required air temperature and number of sections

Steam heating

t_{pk} = 101,5 °C

Thermal power Q (W) at air temperature of t_i (°C)

No. of sections (n)	10	15	18	20	22	24
2	906	842	804	779	755	730
3	1273	1183	1130	1095	1060	1026
4	1639	1524	1456	1410	1366	1321
5	2006	1865	1781	1726	1671	1616
6	2373	2205	2107	2041	1976	1912
7	2739	2546	2432	2357	2282	2207
8	3106	2887	2758	2672	2587	2503
9	3473	3228	3083	2987	2893	2798
10	3839	3569	3409	3303	3198	3094
11	4206	3910	3734	3618	3503	3389
12	4573	4250	4060	3934	3809	3685
13	4939	4591	4385	4249	4114	3980
14	5306	4932	4711	4565	4419	4275
15	5673	5273	5036	4880	4725	4571
16	6039	5614	5362	5195	5030	4866
17	6406	5954	5687	5511	5336	5162
18	6772	6295	6013	5826	5641	5457
19	7139	6636	6338	6142	5946	5753
20	7506	6977	6664	6457	6252	6048
21	7872	7318	6989	6773	6557	6344
22	8239	7659	7315	7088	6863	6639
23	8606	7999	7641	7403	7168	6935
24	8972	8340	7966	7719	7473	7230
25	9339	8681	8292	8034	7779	7525
26	9706	9022	8617	8350	8084	7821
27	10072	9363	8943	8665	8390	8116
28	10439	9703	9268	8981	8695	8412
29	10806	10044	9594	9296	9000	8707
30	11172	10385	9919	9611	9306	9003

CAST-IRON HEATING BODIES

BOHEMIA R

BOHEMIA R

DESCRIPTION

Cast-iron heating body consisting of sections connected into heating systems using steel nipples with external right-hand or left-hand thread G 5/4" is manufactured in the following size: **BOHEMIA R** (with relief) **450/225 mm**.

Heating bodies material complies with EN 442-1 amendment A1 (grey cast-iron to EN 1561, grade 150). The design of castings ensures a long life cycle of products.

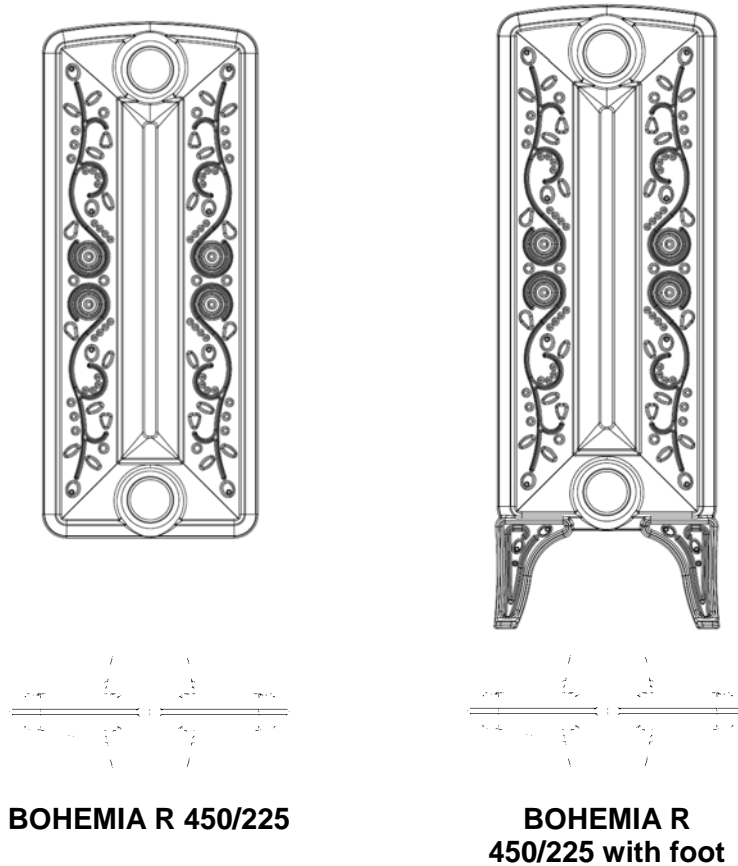


Fig. 1 BOHEMIA R type heating body

USAGE

BOHEMIA heating body is designed for warm-water central heating systems with gravity and forced circulation of heating water with the highest operating temperature not exceeding 115 °C and highest operating overpressure of up to 0.6 MPa. With its design the body is suitable for historical buildings and stylish interiors.

THERMAL AND TECHNICAL PARAMETERS

BOHEMIA R type is certified by SZÚ Brno. Thermal and technical parameters for the heat-transfer fluid (water) have been verified experimentally in compliance with EN 442-2 in the Measuring laboratory of Technical University in DARMSTADT.

Basic thermal and technical parameters are provided in Table 1. Indicated thermal power applies to the heat-transfer fluid (water) with the temperature gradient of 75/65 °C and one-sided lateral connection (supply) of the heat-transfer fluid (water) at the top. The body is measured without cover.

Environment: These heating bodies can be used in the following temperature range: +2 °C up to +35 °C.

Table 1 Significant thermal and technical parameters of BOHEMIA R heating sections

Property	Symbol	450/225 R	450/225 R with foot
Identification number		67	68
Total height	H (mm)	540	640
Spacing	h (mm)	450	450
Depth	B (mm)	225	225
Width	L (mm)	86	86
Connection thread	"	5/4	5/4
Weight	M (kg/ pc)	10,3	11,8
Water volume	V (dm ³ / pc)	2,4	2,4
Thermal power	Q _{Tn} (W/section)	113	113
Heat exponent	n	1,2880	1,2880

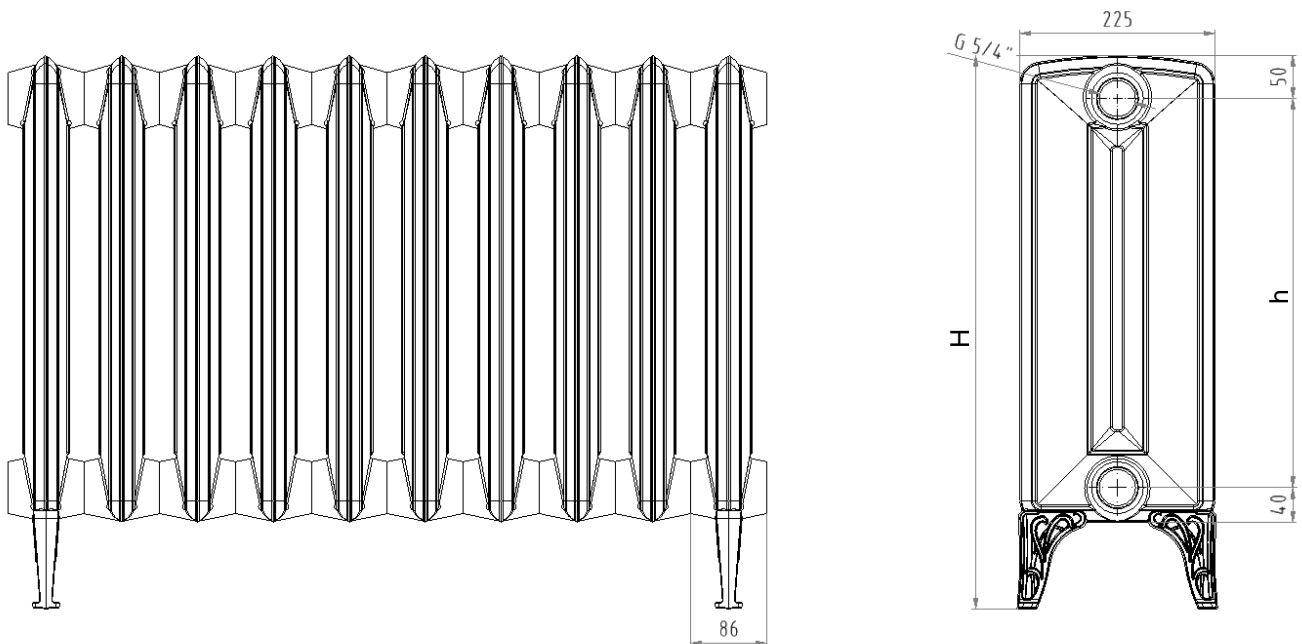


Fig. 2 Standard dimensions of BOHEMIA R sections

TESTING OVERPRESSURE

Units manufactured are subject to the pressure test performed in manufacturer's facility using overpressure of cold water equal to 1 MPa.

ASSEMBLY

In order to achieve required thermal power of heating bodies it is necessary to maintain the installation position indicated on Fig. 3.

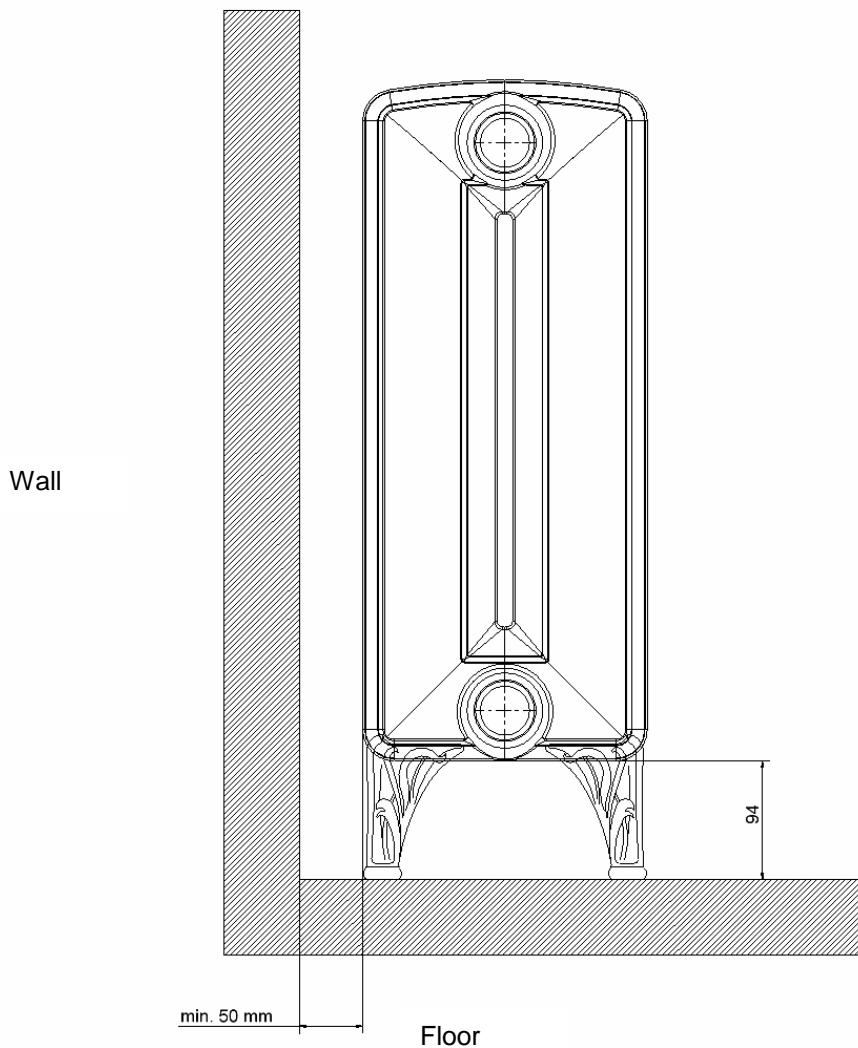


Fig. 3 Installation of BOHEMIA R heating bodies

BOHEMIA heating bodies are connected to the distribution piping using roses provided with external thread G 5/4" with G 3/8", G 1/2", G 3/4" and G 1" bores (**warning: don't use hemp as sealing under these rosettes**).

Openings of the heating body on the opposite side to connection are terminated by solid plugs provided with external left-hand thread G 5/4". The upper plug can be provided with bore with eccentrically positioned thread G 1/4" for the air relief valve. Automatic air relief valves are suitable for this purpose.

Prior to combining the individual units supplied it is necessary to perform a thorough cleaning of contact surfaces of sections and connections should be sealed by TEMASIL packing, which is normally used during production and it is suitable both for warm-water and steam systems. The sections shall be coupled with the torque of min. 130 Nm and max. 150 Nm. by means of steel nipples.

Gyroscopic moment for tightening of rosettes is from 130 Nm to 150 Nm.

Other installation data are provided in the section of instruction manual common for all models of heating bodies manufactured.

Table 2 Number of elements BOHEMIA R with foot

Dimensions of sections (mm)	Number of elements									
	3	4	6	8	10	11	13	15	17	19
BOHEMIA R 450/225 with foot	2					3				

THERMAL POWER TABLES FOR INDIVIDUAL MODELS OF HEATING BODIES

WARM-WATER HEATING

Temperature gradient to EN 442 – 2

Temperature gradients 90/70 °C
 75/65 °C
 55/45 °C

Table 3

Thermal power of heating bodies BOHEMIA R 450/225, h= 450 mm depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 90 \text{ }^\circ\text{C}$

$t_{W2} = 70 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	397	362	341	328	314	298
3	558	509	480	461	442	419
4	718	655	618	593	569	539
5	879	802	756	726	696	660
6	1040	948	894	859	823	781
7	1200	1095	1032	991	950	901
8	1361	1241	1171	1124	1078	1022
9	1522	1388	1309	1257	1205	1143
10	1682	1534	1447	1389	1332	1263
11	1843	1681	1585	1522	1459	1384
12	2004	1828	1723	1655	1586	1505
13	2164	1974	1862	1787	1714	1625
14	2325	2121	2000	1920	1841	1746
15	2486	2267	2138	2053	1968	1867
16	2646	2414	2276	2185	2095	1987
17	2807	2560	2414	2318	2222	2108
18	2968	2707	2552	2451	2350	2229
19	3128	2853	2691	2583	2477	2349
20	3289	3000	2829	2716	2604	2470
21	3450	3146	2967	2849	2731	2591
22	3610	3293	3105	2981	2858	2711
23	3771	3439	3243	3114	2986	2832
24	3932	3586	3382	3247	3113	2953
25	4092	3733	3520	3379	3240	3073
26	4253	3879	3658	3512	3367	3194
27	4414	4026	3796	3645	3494	3315
28	4574	4172	3934	3777	3622	3435
29	4735	4319	4073	3910	3749	3556
30	4896	4465	4211	4043	3876	3677

Table 4

Thermal power of heating bodies BOHEMIA R 450/225, h= 450 mm depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75 \text{ }^\circ\text{C}$

$t_{w2} = 65 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	328	294	274	261	248	236
3	461	413	386	367	349	331
4	593	532	497	473	450	426
5	726	652	608	579	550	522
6	859	771	719	685	651	617
7	991	890	830	790	751	713
8	1124	1009	941	896	852	808
9	1257	1128	1052	1002	952	903
10	1389	1247	1163	1108	1053	999
11	1522	1366	1274	1213	1153	1094
12	1655	1485	1385	1319	1254	1189
13	1787	1604	1496	1425	1355	1285
14	1920	1723	1607	1531	1455	1380
15	2053	1842	1718	1637	1556	1476
16	2185	1961	1829	1742	1656	1571
17	2318	2080	1940	1848	1757	1666
18	2451	2200	2052	1954	1857	1762
19	2583	2319	2163	2060	1958	1857
20	2716	2438	2274	2166	2058	1952
21	2849	2557	2385	2271	2159	2048
22	2981	2676	2496	2377	2260	2143
23	3114	2795	2607	2483	2360	2239
24	3247	2914	2718	2589	2461	2334
25	3379	3033	2829	2694	2561	2429
26	3512	3152	2940	2800	2662	2525
27	3645	3271	3051	2906	2762	2620
28	3777	3390	3162	3012	2863	2716
29	3910	3509	3273	3118	2963	2811
30	4043	3629	3384	3223	3064	2906

Table 5

Thermal power of heating bodies BOHEMIA R 450/225, h= 450 mm depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 55 \text{ }^\circ\text{C}$

$t_{W2} = 45 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	198	168	150	139	126	115
3	278	236	211	195	177	161
4	358	304	272	251	228	208
5	439	372	332	307	279	254
6	519	440	393	363	330	300
7	599	507	454	419	381	347
8	679	575	515	475	432	393
9	759	643	576	531	483	440
10	840	711	636	587	534	486
11	920	779	697	643	585	533
12	1000	847	758	699	636	579
13	1080	915	819	756	687	625
14	1160	983	879	812	738	672
15	1240	1051	940	868	789	718
16	1321	1119	1001	924	840	765
17	1401	1187	1062	980	891	811
18	1481	1255	1122	1036	942	857
19	1561	1323	1183	1092	993	904
20	1641	1390	1244	1148	1044	950
21	1722	1458	1305	1204	1095	997
22	1802	1526	1366	1260	1146	1043
23	1882	1594	1426	1316	1197	1090
24	1962	1662	1487	1373	1248	1136
25	2042	1730	1548	1429	1299	1182
26	2122	1798	1609	1485	1350	1229
27	2203	1866	1669	1541	1401	1275
28	2283	1934	1730	1597	1452	1322
29	2363	2002	1791	1653	1503	1368
30	2443	2070	1852	1709	1554	1415

STEAM HEATING

Steam condensation temperature $t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Table 6

Thermal power of heating bodies BOHEMIA R 450/225, h = 450 mm depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	586	546	523	507	492	476
3	822	767	734	712	691	669
4	1059	988	946	918	890	862
5	1296	1209	1157	1123	1089	1055
6	1533	1430	1369	1328	1288	1248
7	1770	1651	1580	1533	1487	1440
8	2007	1872	1792	1738	1686	1633
9	2244	2093	2003	1944	1885	1826
10	2481	2314	2215	2149	2084	2019
11	2718	2535	2426	2354	2283	2211
12	2955	2756	2638	2559	2482	2404
13	3192	2977	2849	2765	2681	2597
14	3429	3198	3061	2970	2880	2790
15	3666	3419	3272	3175	3079	2983
16	3903	3640	3484	3380	3278	3175
17	4140	3861	3695	3585	3477	3368
18	4377	4082	3907	3791	3675	3561
19	4614	4303	4118	3996	3874	3754
20	4851	4524	4330	4201	4073	3947
21	5088	4745	4541	4406	4272	4139
22	5325	4966	4753	4612	4471	4332
23	5561	5187	4964	4817	4670	4525
24	5798	5408	5176	5022	4869	4718
25	6035	5628	5387	5227	5068	4910
26	6272	5849	5599	5432	5267	5103
27	6509	6070	5810	5638	5466	5296
28	6746	6291	6022	5843	5665	5489
29	6983	6512	6233	6048	5864	5682
30	7220	6733	6445	6253	6063	5874

CAST-IRON HEATING BODIES

STYL

STYL

DESCRIPTION

The cast iron radiator consists of elements, is connected into the systems by means of cast iron nipples with G 1" external right-left thread and is produced up to the size of 500/130 mm. The radiators correspond to EN 442:1 amendment A1 material (grey cast iron according to EN 1561,) and the design of castings guarantees a long service life of products.

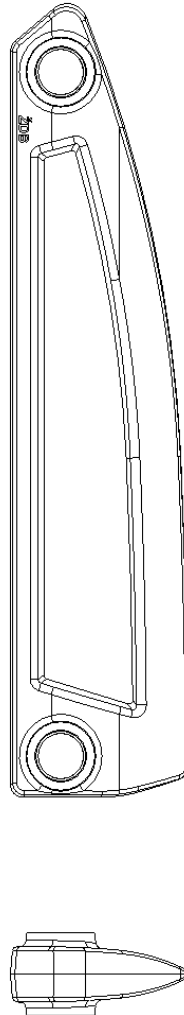


Fig. 1 STYL type heating body

USAGE

STYL heating body is designed for warm-water central heating systems with gravity and forced circulation of heating water with the highest operating temperature not exceeding 115 °C and highest operating overpressure of up to 0.6 MPa. Its design fits to the modern living spaces. In addition to this all models manufactured are approved for steam central heating systems with the maximum operating overpressure of up to 0.07 MPa.

THERMAL - TECHNICAL PARAMETERS

The STYL type is certified by SZÚ Brno, the thermal-technical parameters for water as the heat carrying substance were experimentally attested according to EN 442-2 in a metering centre at the DARMSTADT Technical University.

The main technical characteristics are included in table no.1. The stated heat output applies to water as the heat carrying substance with 75/65 °C temperature gradient, for a single-sided lateral connection of radiators with the heat carrying substance inlet at the top. The radiators are measured without shutters.

The environment: these radiators can be used at +2 °C - +35 °C ambient temperatures.

Table no. 1 The main thermal-technical parameters of a STYL heating element

Attribute	Designation	500/130
Identification number		35
Overall height	H (mm)	580
Spacing	h (mm)	500
Depth	B (mm)	130
Width	L (mm)	60
Connecting thread	"	1"
Weight	M (kg/pc)	3,8
Water volume	V (dm ³ /pc)	0,8
Heat output	Q _{Tn} (W/el.)	70
Heat exponent	n	1,2770

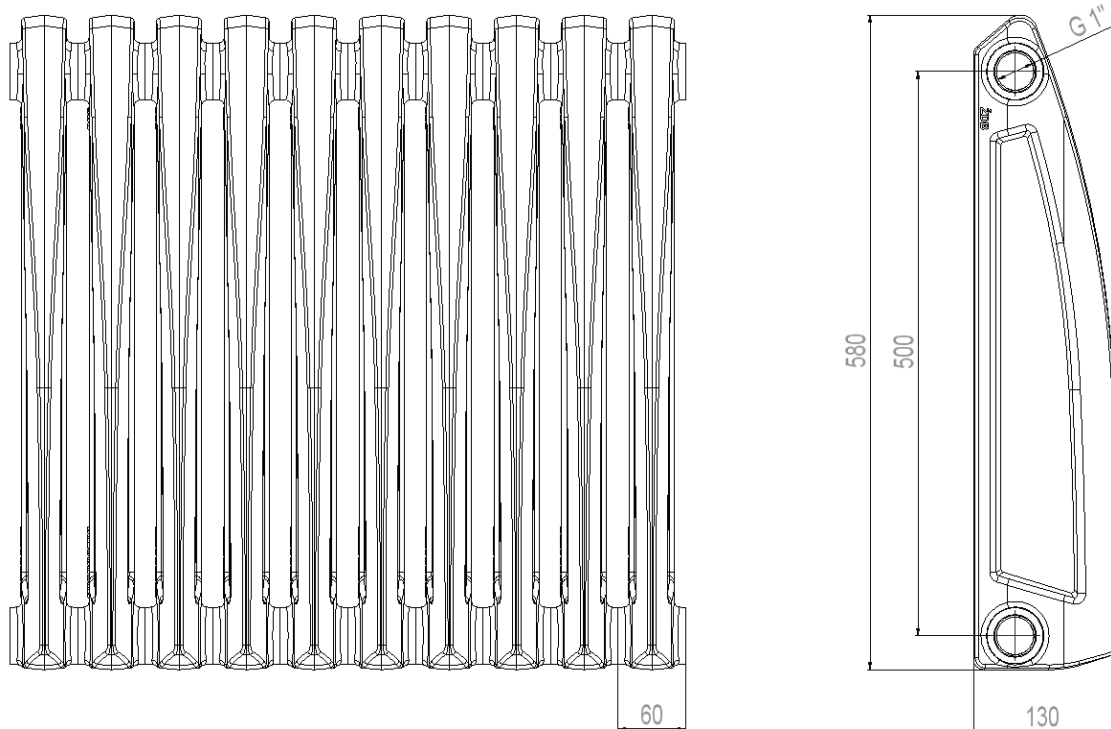


Fig. no. 2 Main dimensions of STYL elements

TEST OVERPRESSURE

The produced systems are by the manufacturer subjected to the pressure test by applying 1 MPa cold water overpressure.

ASSEMBLY

When mounting the radiators it is necessary to keep their position according to Fig. No. 3 in order to achieve the required heat outputs.

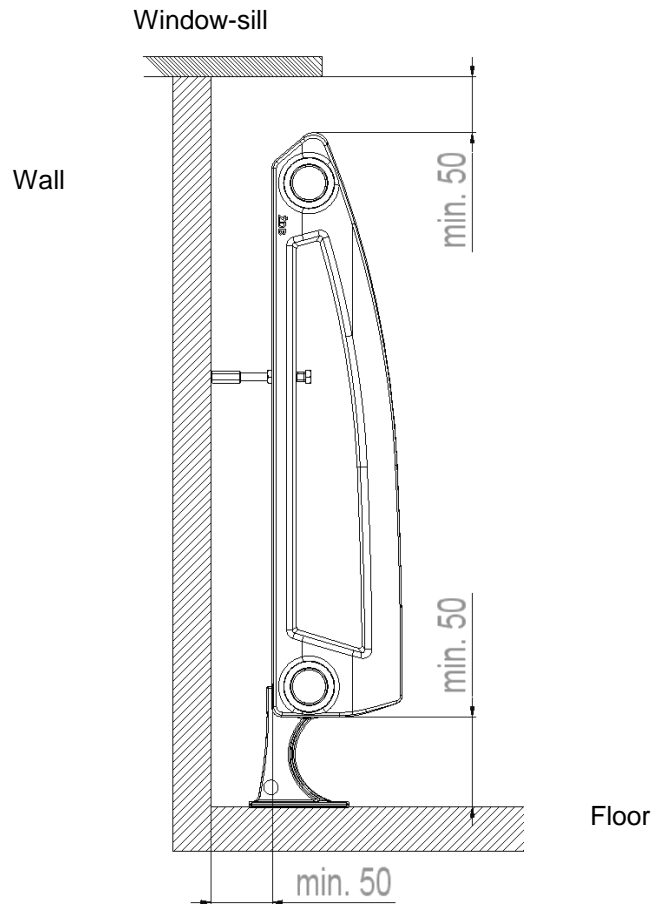


Fig. 3 Installation of STYL heating bodies

For the connection of STYL radiators to the distribution piping there are used the rosettes with external G 1" thread and G 3/8", G 1/2", G 3/4" borings. **(warning: don't use hemp as sealing under these rosettes).**

For closing the nipple openings of radiators on the side across from the connection there are the full plugs with G1" dimension of the left external thread. The upper plug can be provided with boring and eccentrically positioned G 1/4" thread " for an air-relief valve. The use of automatic air-relief valves is suitable.

Before connecting the individual systems the seating faces of element sockets must be cleaned and the connections are recommended to be sealed by using TEMASIL sealing material which is by default used in production and is suitable for both hot water and steam systems. The sections shall be coupled with the torque of min. 130 Nm and max. 150 Nm. by means of steel nipples.

Gyroscopic moment for tightening of rosettes is from 130 Nm to 150 Nm.

Other instructions concerning the assembly are stated in the chapter common for all manufactured types of radiators.

THERMAL POWER TABLES FOR INDIVIDUAL MODELS OF HEATING BODIES

WARM-WATER HEATING

Temperature gradient to EN 442 – 2

Temperature gradients 90/70 °C
 75/65 °C
 55/45 °C

Tab. no. 2

Thermal power of heating bodies STYL 500/130, h = 500 mm depending on required air temperature and number of sections for warm-water heating

Warm-water heating

$t_{w1} = 90\text{ }^{\circ}\text{C}$

$t_{w2} = 70\text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	253	230	216	208	199	190
3	355	323	304	292	279	267
4	457	416	392	376	360	344
5	560	509	479	460	440	421
6	662	602	567	544	521	498
7	764	695	655	628	601	575
8	867	788	742	712	682	652
9	869	881	830	796	762	729
10	1071	974	917	880	842	806
11	1173	1067	1005	964	923	882
12	1276	1161	1093	1048	1003	959
13	1378	1254	1180	1132	1084	1036
14	1480	1347	1268	1216	1164	1113
15	1583	1440	1355	1300	1245	1190
16	1685	1533	1443	1384	1325	1267
17	1787	1626	1531	1468	1403	1344
18	1889	1719	1618	1552	1486	1421
19	1992	1812	1706	1636	1567	1498
20	2094	1905	1793	1720	1647	1575
21	2196	1998	1881	1804	1727	1652
22	2299	2091	1969	1888	1808	1729
23	2401	2184	2056	1972	1888	1806
24	2503	2277	2144	2056	1969	1883
25	2606	2370	2231	2140	2049	1959
26	2708	2463	2319	2224	2130	2036
27	2810	2556	2407	2308	2210	2113
28	2912	2649	2494	2392	2291	2190
29	3015	2742	2582	2476	2371	2267
30	3117	2836	2669	2560	2452	2344

Tab. no. 2

Thermal power of heating bodies STYL 500/130, h = 500 mm depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75 \text{ }^\circ\text{C}$

$t_{w2} = 65 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	208	186	173	164	156	148
3	292	261	243	231	219	208
4	376	336	313	298	283	268
5	460	411	383	364	346	327
6	544	486	453	431	409	387
7	628	562	523	497	472	447
8	712	637	593	564	535	507
9	796	712	663	630	598	567
10	880	787	733	697	662	627
11	964	862	803	764	725	686
12	1048	938	873	830	788	746
13	1132	1013	943	897	851	806
14	1216	1088	1013	963	914	866
15	1300	1163	1083	1030	978	926
16	1384	1238	1153	1096	1041	986
17	1468	1313	1223	1163	1104	1045
18	1552	1389	1293	120	1167	1105
19	1636	1464	1363	1296	1230	1165
20	1720	1539	1433	1363	1293	1225
21	1804	1614	1533	1429	1357	1285
22	1888	1689	1573	1496	1420	1345
23	1972	1765	1643	1562	1483	1405
24	2056	1840	1713	1629	1546	1464
25	2140	1915	1783	1695	1609	1524
26	2224	1990	1853	1762	1673	1584
27	2308	2065	1922	1829	1736	1644
28	2392	2140	1992	1895	1799	1704
29	2476	2216	2062	1962	1862	1764
30	2560	2291	2132	2028	1925	1823

Tab. no. 4

Thermal power of heating bodies STYL 500/130, h = 500 mm depending on required air temperature and number of sections for warm-water heating

Warm-water heating

$t_{w1} = 55 \text{ }^{\circ}\text{C}$

$t_{w2} = 45 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	124	104	93	86	78	71
3	174	147	121	120	110	100
4	224	189	168	155	142	129
5	274	231	206	190	174	158
6	324	273	244	224	205	187
7	374	315	281	259	237	216
8	424	358	319	294	269	245
9	474	400	357	328	301	274
10	524	442	394	363	332	302
11	574	484	432	398	364	331
12	624	526	470	432	396	360
13	674	569	507	467	428	389
14	724	611	545	502	459	418
15	774	653	582	536	492	447
16	825	695	620	571	523	476
17	875	737	658	606	555	505
18	925	780	695	640	586	533
19	975	822	733	675	618	562
20	1025	864	771	710	650	591
21	1075	906	808	744	682	620
22	1125	949	846	779	713	649
23	1175	991	884	814	745	678
24	1225	1033	921	848	777	707
25	1275	4075	959	883	809	736
26	1325	1117	997	918	840	764
27	1375	1160	1034	952	872	793
28	1425	1202	1072	987	904	822
29	1475	1244	1109	1022	936	851
30	1525	1286	1147	1056	967	880

STEAM HEATING

Steam condensation temperature $t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Table 5
Thermal power of heating bodies Bohemia 450/220, h = 450 mm depending on
required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	376	350	335	325	314	304
3	529	492	470	456	442	428
4	681	634	606	587	569	551
5	833	775	741	719	696	674
6	985	917	877	850	823	797
7	1138	1059	1012	981	951	920
8	1290	1201	1148	1113	1078	1043
9	1442	1342	1283	1244	1205	1167
10	1594	1484	1419	1375	1332	1290
11	1747	1626	1554	1507	1460	1413
12	1899	1768	1690	1638	1587	1536
13	2051	1909	1825	1769	1714	1659
14	2204	2051	1961	1901	1841	1783
15	2356	2193	2096	2032	1969	1906
16	2508	2334	2232	2164	2096	2029
17	2660	2476	2367	2295	2223	2152
18	2813	2618	2503	2426	2350	2275
19	2965	2760	2638	2558	2478	2398
20	3117	2901	2773	2689	2605	2522
21	3270	3043	2909	2820	2732	2645
22	3422	3185	3044	2952	2859	2768
23	3574	3327	3180	3083	2987	2891
24	3726	3468	3315	3214	3114	3014
25	3879	3610	3451	3346	3241	3137
26	4031	3752	3586	3477	3368	3261
27	4183	3893	3722	3608	3496	3384
28	4335	4035	3857	3740	3623	3507
29	4488	4177	3993	3871	3750	3630
30	4640	4319	4128	4002	3877	3753

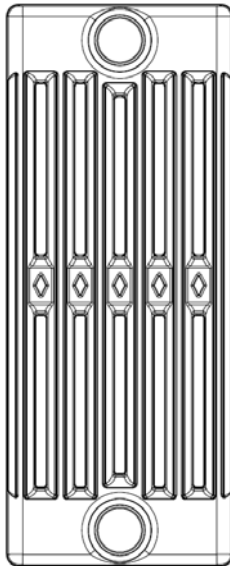
CAST-IRON HEATING BODIES

HELLAS

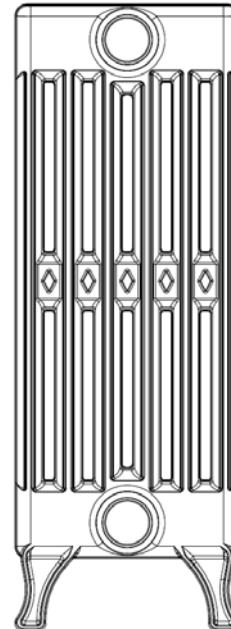
HELLAS

DESCRIPTION

Cast-iron heating body consisting of sections connected into heating systems using steel nipples with external right-hand or left-hand thread G 5/4" is manufactured in the following size: **270 and 470 mm**. Heating bodies material complies with EN 442-1 amendment A1 (grey cast-iron to EN 1561, grade 150). The design of castings ensures a long life cycle of products.



HELLAS 270 and HELLAS 470



HELLAS 270 and HELLAS 470 with foot

Fig. 1 HELLAS type heating body

USAGE

HELLAS heating body is designed for warm-water central heating systems with gravity and forced circulation of heating water with the highest operating temperature not exceeding 115 °C and highest operating overpressure of up to 0.6 MPa. With its design the body is suitable for historical buildings and stylish interiors.

THERMAL AND TECHNICAL PARAMETERS

HELLAS type is certified by SZÚ Brno. Thermal and technical parameters for the heat-transfer fluid (water) have been verified experimentally in compliance with EN 442-2 in the Measuring laboratory of Technical University in DARMSTADT.

Basic thermal and technical parameters are provided in Table 1. Indicated thermal power applies to the heat-transfer fluid (water) with the temperature gradient of 75/65 °C and one-sided lateral connection (supply) of the heat-transfer fluid (water) at the top. The body is measured without cover.

Environment: These heating bodies can be used in the following temperature range: +2 °C up to +35 °C.

Table 1 Significant thermal and technical parameters of HELLAS heating sections

Property	Symbol	HELLAS 270	HELLAS 270 with foot	HELLAS 470	HELLAS 470 with foot
Identification number		65	66	63	64
Total height	L1 (mm)	340	410	540	610
Spacing	L (mm)	270	270	470	470
Depth	B (mm)	218	218	218	218
Width	H (mm)	50	50	50	50
Connection thread	"	5/4"	5/4"	5/4"	5/4"
Weight	M (kg/ pc)	4,85	5,35	7,21	7,71
Water volume	V (dm ³ / pc)	0,85	0,85	1,16	1,16
Thermal power	Q _{Tn} (W/ sect.)	70	70	108	108
Heat exponent	n	1,3191	1,3191	1,3535	1,3535

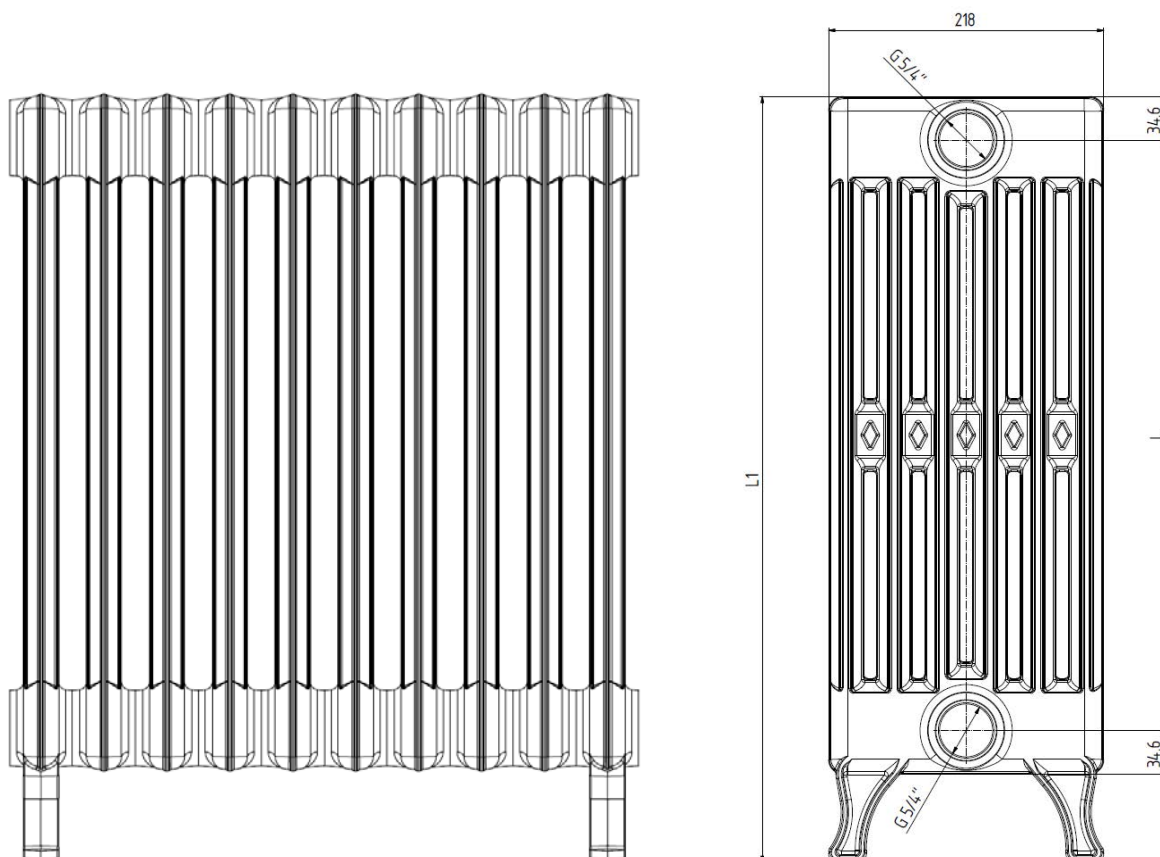


Fig. 2 Standard dimensions of HELLAS sections

TESTING OVERPRESSURE

Units manufactured are subject to the pressure test performed in manufacturer's facility using overpressure of cold water equal to 1 MPa.

ASSEMBLY

In order to achieve required thermal power of heating bodies it is necessary to maintain the installation position indicated on Fig. 3.

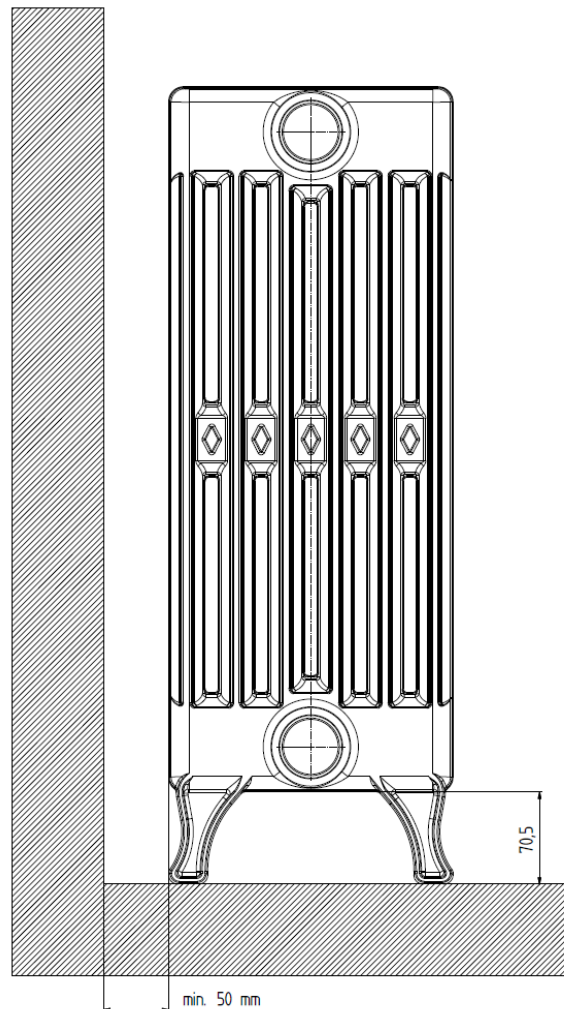


Fig. 3 Installation of HELLAS heating bodies

HELLAS heating bodies are connected to the distribution piping using roses provided with external thread G 5/4" with G 3/8", G 1/2", G 3/4" and G 1" bores (**warning: don't use hemp as sealing under these rosettes**).

Openings of the heating body on the opposite side to connection are terminated by solid plugs provided with external left-hand thread G 5/4". The upper plug can be provided with bore with eccentrically positioned thread G 1/4" for the air relief valve. Automatic air relief valves are suitable for this purpose.

Prior to combining the individual units supplied it is necessary to perform a thorough cleaning of contact surfaces of sections and connections should be sealed by TEMASIL packing, which is normally used during production and it is suitable both for warm-water and steam systems. The sections shall be coupled with the torque of min. 130 Nm and max. 150 Nm. by means of steel nipples.

Gyroscopic moment for tightening of rosettes is from 130 Nm to 150 Nm.

Other installation data are provided in the section of instruction manual common for all models of heating bodies manufactured.

Table 2 Number of elements HELLAS with foot

Dimensions of sections (mm)	Number of elements															
	3	4	6	8	10	12	13	14	15	17	19	21	23	25	27	29
HELLAS 270					2								3			
HELLAS 470					2								3			

THERMAL POWER TABLES FOR INDIVIDUAL MODELS OF HEATING BODIES

WARM-WATER HEATING

Temperature gradient to EN 442 – 2

Temperature gradients 90/70 °C
 75/65 °C
 55/45 °C

Table 3

Thermal power of heating bodies HELLAS 270, h = 270 mm depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 90\text{ }^{\circ}\text{C}$

$t_{w2} = 70\text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	259	234	220	211	202	191
3	363	329	309	296	283	268
4	468	424	399	382	365	345
5	572	519	488	467	447	422
6	677	614	577	552	528	500
7	782	709	666	638	610	577
8	886	804	755	723	692	654
9	991	899	844	809	773	731
10	1096	994	934	894	855	808
11	1200	1088	1023	979	937	885
12	1305	1183	1112	1065	1018	963
13	1410	1278	1201	1150	1100	1040
14	1514	1373	1290	1236	1181	1117
15	1619	1468	1379	1321	1263	1194
16	1723	1563	1468	1406	1345	1271
17	1828	1658	1558	1492	1426	1349
18	1933	1753	1647	1577	1508	1426
19	2037	1848	1736	1662	1590	1503
20	2142	1942	1825	1748	1671	1580
21	2247	2037	1914	1833	1753	1657
22	2351	2132	2003	1919	1835	1735
23	2456	2227	2093	2004	1916	1812
24	2561	2322	2182	2089	1998	1889
25	2665	2417	2271	2175	2080	1966
26	2770	2512	2360	2260	2161	2043
27	2874	2607	2449	2345	2243	2120
28	2979	2702	2538	2431	2324	2198
29	3084	2796	2627	2516	2406	2275
30	3188	2891	2717	2602	2488	2352

Table 4

Thermal power of heating bodies HELLAS 270, h = 270 mm depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75 \text{ }^\circ\text{C}$

$t_{w2} = 65 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	211	188	175	166	157	149
3	296	264	245	233	221	209
4	382	340	316	300	284	269
5	467	416	387	367	348	329
6	552	493	457	434	412	389
7	638	569	528	501	475	449
8	723	645	599	569	539	509
9	809	721	670	636	602	570
10	894	797	740	703	666	630
11	979	873	811	770	730	690
12	1065	949	882	837	793	750
13	1150	1025	952	904	857	810
14	1236	1102	1023	971	920	870
15	1321	1178	1094	1038	984	930
16	1406	1254	1164	1106	1048	990
17	1492	1330	1235	1173	1111	1051
18	1577	1406	1306	1240	1175	1111
19	1662	1482	1376	1307	1238	1171
20	1748	1558	1447	1374	1302	1231
21	1833	1634	1518	1441	1366	1291
22	1919	1710	1588	1508	1429	1351
23	2004	1787	1659	1575	1493	1411
24	2089	1863	1730	1643	1556	1471
25	2175	1939	1801	1710	1620	1532
26	2260	2015	1871	1777	1684	1592
27	2345	2091	1942	1844	1747	1652
28	2431	2167	2013	1911	1811	1712
29	2516	2243	2083	1978	1874	1772
30	2602	2319	2154	2045	1938	1832

Table 5

Thermal power of heating bodies HELLAS 270, h = 270 mm depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55 \text{ }^\circ\text{C}$

$t_{w2} = 45 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	124	104	92	85	76	69
3	174	146	129	119	107	97
4	224	187	167	153	138	125
5	274	229	204	187	169	153
6	324	271	241	221	200	181
7	374	313	278	256	231	209
8	424	355	316	290	262	237
9	474	397	353	324	293	265
10	524	439	390	358	324	293
11	574	481	427	392	355	321
12	624	523	465	427	386	349
13	674	565	502	461	417	377
14	724	607	539	495	448	405
15	774	649	576	529	479	433
16	824	691	614	563	509	461
17	874	733	651	598	540	489
18	924	774	688	632	571	517
19	974	816	725	666	602	545
20	1024	858	763	700	633	573
21	1074	900	800	735	664	601
22	1124	942	837	769	695	629
23	1174	984	874	803	726	657
24	1224	1026	912	837	757	685
25	1274	1068	949	871	788	713
26	1324	1110	986	906	819	741
27	1374	1152	1023	940	850	769
28	1424	1194	1061	974	881	797
29	1474	1236	1098	1008	912	825
30	1524	1278	1135	1042	942	853

Table 6

Thermal power of heating bodies HELLAS 470, h = 470 mm depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 90\text{ }^{\circ}\text{C}$

$t_{W2} = 70\text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	405	366	343	328	314	296
3	568	514	482	461	441	416
4	732	662	621	594	567	536
5	896	810	760	727	694	655
6	1059	958	899	860	821	775
7	1223	1106	1038	993	948	895
8	1387	1254	1177	1126	1075	1015
9	1550	1402	1315	1258	1202	1135
10	1714	1550	1454	1391	1329	1255
11	1878	1698	1593	1524	1456	1374
12	2041	1847	1732	1657	1583	1494
13	2205	1995	1871	1790	1710	1614
14	2369	2143	2010	1923	1836	1734
15	2532	2291	2149	2056	1963	1854
16	2696	2439	2288	2188	2090	1973
17	2860	2587	2427	2321	2217	2093
18	3024	2735	2566	2454	2344	2213
19	3187	2883	2704	2587	2471	2333
20	3351	3031	2843	2720	2598	2453
21	3515	3179	2982	2853	2725	2572
22	3678	3327	3121	2986	2852	2692
23	3842	3475	3260	3118	2979	2812
24	4006	3623	3399	3251	3106	2932
25	4169	3771	3538	3384	3232	3052
26	4333	3919	3677	3517	3359	3171
27	4497	4068	3816	3650	3486	3291
28	4660	4216	3954	3783	3613	3411
29	4824	4364	4093	3916	3740	3531
30	4988	4512	4232	4049	3867	3651

Table 7

Thermal power of heating bodies HELLAS 470, h = 470 mm depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 75 \text{ }^\circ\text{C}$

$t_{w2} = 65 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	328	292	271	257	243	229
3	461	410	380	360	341	322
4	594	528	489	464	439	415
5	727	646	599	568	537	507
6	860	764	708	672	636	600
7	993	882	818	776	734	693
8	1126	1000	927	879	832	786
9	1258	1119	1037	983	930	878
10	1391	1237	1146	1087	1029	971
11	1524	1355	1256	1191	1127	1064
12	1657	1473	1365	1295	1225	1156
13	1790	1591	1475	1398	1323	1249
14	1923	1709	1584	1502	1421	1342
15	2056	1827	1694	1606	1520	1435
16	2188	1945	1803	1710	1618	1527
17	2321	2063	1913	1814	1716	1620
18	2454	2181	2022	1917	1814	1713
19	2587	2300	2131	2021	1913	1806
20	2720	2418	2241	2125	2011	1898
21	2853	2536	2350	2229	2109	1991
22	2986	2654	2460	2333	2207	2084
23	3118	2772	2569	2437	2306	2176
24	3251	2890	2679	2540	2404	2269
25	3384	3008	2788	2644	2502	2362
26	3517	3126	2898	2748	2600	2455
27	3650	3244	3007	2852	2698	2547
28	3783	3363	3117	2956	2797	2640
29	3916	3481	3226	3059	2895	2733
30	4049	3599	3336	3163	2993	2826

Table 8

Thermal power of heating bodies HELLAS 470, h = 470 mm depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 55\text{ °C}$

$t_{W2} = 45\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No. of sections (n)	10	15	18	20	22	24
2	190	158	140	128	116	105
3	266	222	197	180	163	147
4	343	286	254	232	210	189
5	420	350	310	284	257	231
6	497	415	367	336	303	274
7	573	479	424	388	350	316
8	650	543	481	440	397	358
9	727	607	537	492	444	401
10	804	671	594	544	491	443
11	880	735	651	596	538	485
12	957	799	708	648	585	528
13	1034	863	764	700	632	570
14	1111	927	821	752	678	612
15	1187	991	878	804	725	655
16	1264	1055	935	856	772	697
17	1341	1119	991	908	819	739
18	1418	1183	1048	960	866	782
19	1494	1247	1105	1012	913	824
20	1571	1311	1162	1064	960	866
21	1648	1375	1218	1116	1007	908
22	1725	1439	1275	1168	1054	951
23	1801	1504	1332	1220	1100	993
24	1878	1568	1389	1272	1147	1035
25	1955	1632	1445	1324	1194	1078
26	2032	1696	1502	1376	1241	1120
27	2108	1760	1559	1428	1288	1162
28	2185	1824	1615	1480	1335	1205
29	2262	1888	1672	1532	1382	1247
30	2339	1952	1729	1584	1429	1289

STEAM HEATING

Steam condensation temperature $t_{pk} = 101,5 \text{ } ^\circ\text{C}$

Table 9

Thermal power of heating bodies HELLAS 270, h = 270 mm depending on required air temperature and number of sections

Steam heating

t_{pk} = 101,5 °C

Thermal power Q (W) at air temperature of t_i (°C)

No. of sections (n)	10	15	18	20	22	24
2	389	361	345	334	323	313
3	547	508	485	469	454	439
4	704	654	624	605	585	566
5	862	800	764	740	716	692
6	1019	947	904	875	847	819
7	1177	1093	1043	1010	978	945
8	1335	1239	1183	1146	1109	1072
9	1492	1385	1322	1281	1239	1199
10	1650	1532	1462	1416	1370	1325
11	1807	1678	1602	1551	1501	1452
12	1965	1824	1741	1686	1632	1578
13	2122	1971	1881	1822	1763	1705
14	2280	2117	2021	1957	1894	1831
15	2437	2263	2160	2092	2025	1958
16	2595	2409	2300	2227	2156	2084
17	2752	2556	2439	2363	2286	2211
18	2910	2702	2579	2498	2417	2337
19	3067	2848	2719	2633	2548	2464
20	3225	2995	2858	2768	2679	2590
21	3383	3141	2998	2904	2810	2717
22	3540	3287	3138	3039	2941	2844
23	3698	3433	3277	3174	3072	2970
24	3855	3580	3417	3309	3203	3097
25	4013	3726	3556	3444	3333	3223
26	4170	3872	3696	3580	3464	3350
27	4328	4019	3836	3715	3595	3476
28	4485	4165	3975	3850	3726	3603
29	4643	4311	4115	3985	3857	3729
30	4800	4457	4255	4121	3988	3856

Table 10

Thermal power of heating bodies HELLAS 470, h = 470 mm depending on required air temperature and number of sections

Steam heating

$t_{pk} = 101,5 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No. of sections (n)	10	15	18	20	22	24
2	615	570	543	526	508	491
3	863	800	763	738	714	690
4	1112	1031	983	951	919	888
5	1361	1261	1202	1163	1125	1087
6	1609	1492	1422	1376	1331	1285
7	1858	1722	1642	1589	1536	1484
8	2107	1953	1862	1801	1742	1683
9	2356	2183	2081	2014	1947	1881
10	2604	2414	2301	2227	2153	2080
11	2853	2644	2521	2439	2359	2279
12	3102	2875	2740	2652	2564	2477
13	3350	3105	2960	2865	2770	2676
14	3599	3336	3180	3077	2976	2875
15	3848	3566	3400	3290	3181	3073
16	4097	3797	3619	3503	3387	3272
17	4345	4027	3839	3715	3592	3471
18	4594	4258	4059	3928	3798	3669
19	4843	4488	4279	4141	4004	3868
20	5091	4719	4498	4353	4209	4067
21	5340	4949	4718	4566	4415	4265
22	5589	5180	4938	4779	4621	4464
23	5838	5410	5158	4991	4826	4663
24	6086	5641	5377	5204	5032	4861
25	6335	5871	5597	5416	5237	5060
26	6584	6102	5817	5629	5443	5258
27	6832	6332	6037	5842	5649	5457
28	7081	6563	6256	6054	5854	5656
29	7330	6793	6476	6267	6060	5854
30	7579	7024	6696	6480	6265	6053

SUPPLEMENTARY DATA

SUPPLEMENTARY DATA

The outer surface of the radiators before their installation must be furnished with the final coating intended for the surface treatment of radiators. The process of coating is governed by the instructions of the manufacturer of the final coating material.

The heating system must be filled with water meeting the ČSN 07 7401 requirements; especially its hardness must not exceed the required parameters

Recommended values		
Hardness	mmol/l	1
Ca ²⁺	mmol/l	0,3
The total Fe + Mn concentration	mg/l	(0,3)*

*) recommended value

The use of a heat transferring material that differs from that for which the radiators were verified (e.g. antifreeze) will cause a change in the heat output. The manufacturer does not recommend the use of antifreeze. The use of such compounds is therefore necessary to consult with the manufacturer of antifreeze. We recommend to add inhibitors to the heat carrying medium (e.g. INHICOR I, II).

Models of heating bodies Kalor, Kalor 3, Termo and Styl may be provided with thermostatic valves.

The class of reaction to fire A1

SURFACE FINISHING

KALOR, KALOR 3, TERMO, STYL, BOHEMIA, BOHEMIA R, HELLAS

The radiators in the production factory are fitted with standard basic protective coating by applying a coating material dilutable with water. Primers serve for temporary protection of radiators and as a subgrade for the final coat. The radiators during the storage, transportation and handling must be protected against the weather effects.

The front contact surfaces of shrunk rings (sockets) and the insertion openings are protected by plastic closures (lids). The final coat is carried out by the assembly organization according to requirement stated in the implementation project or by customers. But on request the radiators including the final paint can be delivered directly from the VIADRUS a.s.

BOHEMIA, BOHEMIA R, HELLAS

Finishing of radiators in the factory is done with dispersion coating Wecofan RAL 9007

At request of the customer the final surface treatment can be carried out in a different colour shade according to RAL sampler, which can be found on our website www.viadrus.cz.

INSTALLATION INSTRUCTIONS

If the cast-iron heating bodies are used for central heating systems with forced circulation of heating water it is advisable to perform flushing of the system (preferably three times) prior to turning the pump on. This will ensure removal of all impurities, avoid clogging of the pump and ensure long-term trouble-free operation.

PACKAGING, TRANSPORT, STORAGE

KALOR, KALOR 3, TERMO

These heating bodies are usually delivered in sets of 10 sections, however, different size of the set can be provided based on agreement. Products may be shipped by all suitable means of transport, e.g. railway cars, trucks, containers, etc. The sets are placed horizontally during transport – bodies with depth of 160 and 130 mm in max. 7 layers, while bodies with depth of 110 mm and smaller in max. 10 layers. The sets shall be secured against shifting during transport properly. The lowermost layer shall be laid on horizontal surface to avoid slipping. Customer shall store the products in such a way to protect them against climatic effects. During transport and storage it is necessary to prevent abrupt changes in temperature (risk of condensation of water). To storage apply the same principles as to transportation.

When handling the sets it is necessary to exercise a proper care to avoid damage of sections. Sets can be carried only in vertical position in order to prevent their deflection (applies especially to longer sets) and damage or packing in joints.

STYL

These heating bodies are usually delivered in sets of 10 sections, however, different size of the set can be provided based on agreement. **It is also possible to order a selected set of radiator STYL in version 5, 10, 15, 20 and 25 segments including the final coating. The prefabricated STYL radiators, brackets for top and bottom gripping, air vent and integrated thermostatic valve including the thermostatic head are the parts of a given set.** Products may be shipped by all suitable means of transport, e.g. railway cars, trucks, containers, etc. For transport the sets are laid horizontally in maximally seven layers above each other. The sets shall be secured against shifting during transport properly. The lowermost layer shall be laid on horizontal surface to avoid slipping. Customer shall store the products in such a way to protect them against climatic effects. During transport and storage it is necessary to prevent abrupt changes in temperature (risk of condensation of water). To storage apply the same principles as to transportation.

When handling the sets it is necessary to exercise a proper care to avoid damage of sections. Sets can be carried only in vertical position in order to prevent their deflection (applies especially to longer sets) and damage or packing in joints.

BOHEMIA, BOHEMIA R, HELLAS

Heating bodies are wrapped into protective foil. Cardboard sheets are inserted between individual sections placed on the transport pallet. These packages can be disposed of as a normal municipal waste. Products may be shipped by all suitable means of transport, e.g. railway cars, trucks, containers, etc. The sets shall be secured against shifting during transport properly. Customer shall store the products in such a way to protect them against climatic effects. During transport and storage it is necessary to prevent abrupt changes in temperature (risk of condensation of water). To storage apply the same principles as to transportation.

When handling the sets it is necessary to exercise a proper care to avoid damage of sections. Sets can be carried only in vertical position in order to prevent their deflection (applies especially to longer sets) and damage or packing in joints.

ORDERING

Ordering heating body KALOR, KALOR 3, TERMO A STYL

Purchase order shall include the following data:

- type of heating body
- connection spacing and depth
- number of sections or sets expressed in pieces
- An above standard specification (ITV valve, surface treatment)

Rosettes, stoppers, consoles and other accessories can be ordered according to the ordering codes listed in chapter Accessories and the current price list of VIADRUS, see www.viadrus.cz.

The internal thread in a rosette can be 3/8", 1/2", 3/4" or 1". The stopper is a full rosette.

The specification of placement of rosettes for connecting of the body is a part of placing an order.

As accessories customers may order brackets, holders, bolts, gudgeons, stand profile with the set and all necessary roses and plugs according to information provided in the Installation instructions chapter.

Ordering heating body BOHEMIA, BOHEMIA R and HELLAS

The heating bodies Bohemia R 450/225 and Bohemia 450/220 are supplied in sets at request from 3 to 19 cells. For sizes up to 12 cells there are 2 cells in a set with a foot. In case of sets of larger sizes there are 3 cells with a foot. By reason of symmetry of each of sets are the heating bodies above 12 cells delivered only with an odd number of cells.

The heating bodies Bohemia 800/220 are supplied in sets of size from 3 to 19 cells. In case of size of the set up to 10 cells there are 2 feet, in case of size from 11 to 15 cells there are 3 feet and in case of size from 15 to 19 cells there are 4 feet. By reason of symmetry of each of sets are the heating bodies above 10 cells delivered only with an odd number of cells. The bodies over 10 cells are supplied in a disassembled form.

Hellas heating bodies are available in sets at request from 3 to 29 cells. For sizes up to 14 cells in there are 2 cells with a foot. In case of larger sizes of sets there are 3 cells with a foot. By reason of symmetry of each of sets are the heating bodies above 14 cells delivered only with an odd number of cells.

The order must specify the type of rosettes which have to be mounted on the body and the number of RAL colour shade.

Dimensions of sections (mm)	Number of elements									
	3	4	6	8	10	11	13	15	17	19
BOHEMIA 450/220 with foot	2					3				
BOHEMIA 800/220 with foot	2					3			4	

Dimensions of sections (mm)	Number of elements									
	3	4	6	8	10	11	13	15	17	19
BOHEMIA R 450/225 with foot	2					3				

Dimensions of sections (mm)	Number of elements														
	3	4	6	8	10	12	13	14	15	17	19	21	23	25	27	29
HELLAS 270 with foot	2							3							
HELLAS 470 with foot	2							3							

DELIVERY TIME

- 2 – 4 weeks in case of standard heating bodies manufacture

The delivery time begins on receipt of the binding order. In case the ordered goods aren't in stock the seller informs the buyer and at same time he will inform him about the preliminary delivery date.

WARRANTY

The manufacturer provides a guarantee for manufacturing defects of supplied sets of cast-iron radiators for 20 years from the date of shipment from the VIADRUS a.s..

The guarantee of 24 months from date of shipment from the VIADRUS a.s. applies to the final surface treatment, accessories and integrated thermostatic valve.

Maximum allowable deflection in the axis of the socket openings (openings of shrunk rings) is 1.8 mm in case of a set consisting of 10-segment radiators.

The manufacturer assumes no responsibility for damage of the sets of radiators caused by their transport, handling and storage. The guarantee does not apply to mechanical and other damage caused by incorrect installation of radiators. Infringement of the entirety of the sets of radiators supplied by the manufacturer for these purposes is considered as an unprofessionally executed installation.

VIADRUS a.s. is a major producer of cast iron in the Czech Republic with more than a century of tradition.

Established and certified system of quality management according to ISO 9001 guarantees customers a high and constant quality of products and services.

INTEGRATED THERMOSTATIC VALVE

INTEGRATED THERMOSTATIC VALVE “VIADRUS ITV” with adjustable valve insert “V”

Thanks to application of thermostatic valves in heating equipment it is possible to control individually the required room temperature and save the energy. This ensures reduction of heating costs.

Radiators with ITV can be connected to all types of piping DN 10 - DN 20 (3/8 ", 1/2", 3/4 ")

Integrated thermostatic valve “VIADRUS ITV” with adjustable valve insert “V” was developed based on cooperation of company VIADRUS a.s. with Danfoss company. This valve can be used for the above specified dimension – size range.

Integrated thermostatic valve “VIADRUS ITV” with adjustable valve insert “V” is supplied with a pair of heating sections coupled together using modified radiator nipples.

In the columns of radiators there are internal threads for screwed fitting of radiators 1/2 " for carrying out of the bottom connection.

For the integrated thermostatic valve you can additionally order a thermostatic head RAE 5054 (Code 12887).

Currently are produced versions for radiators with 5/4 "thread and 1" thread.

For 5/4" thread can be used for heating bodies of the following types:

KALOR manufactured in eight models: 350/160 mm (IN 2), 500/70 mm (IN 4), 500/110 mm (IN 6), 500/160 mm (IN 8), 500/220 mm (IN 10), 600/160 (IN 12) mm, 900/70 mm (IN 14) and 900/160 mm (IN 16)

KALOR 3 manufactured in five models: 350/160 mm (IN 18), 500/70 mm (IN 20), 500/110 mm (IN 22), 500/160 mm (IN 24) and 900/70 mm (IN 26)

For 1" thread can be used for heating bodies of the following types:

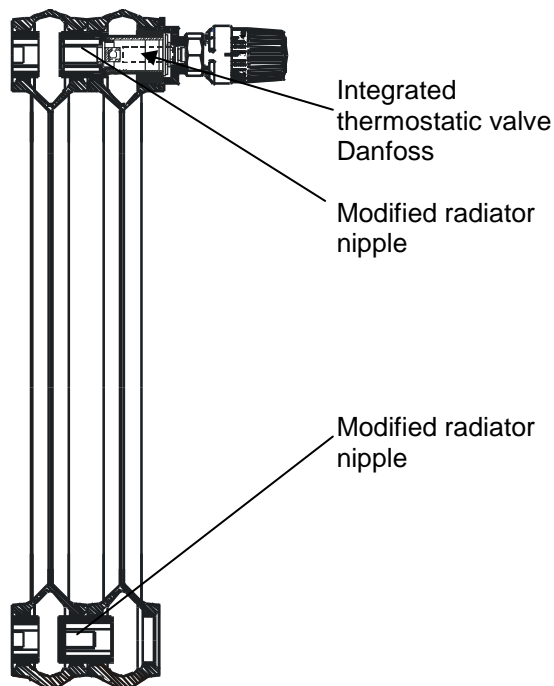
TERMO manufactured in six models:

500/95 mm (IN 28), 500/130 mm (IN 30), 623/95 mm (IN 32), 623/130 mm (IN 34), 813/95 mm (IN 36) and 813/130 mm (IN 38)

STYL manufactured in one model:

500/130 mm (IN 40)

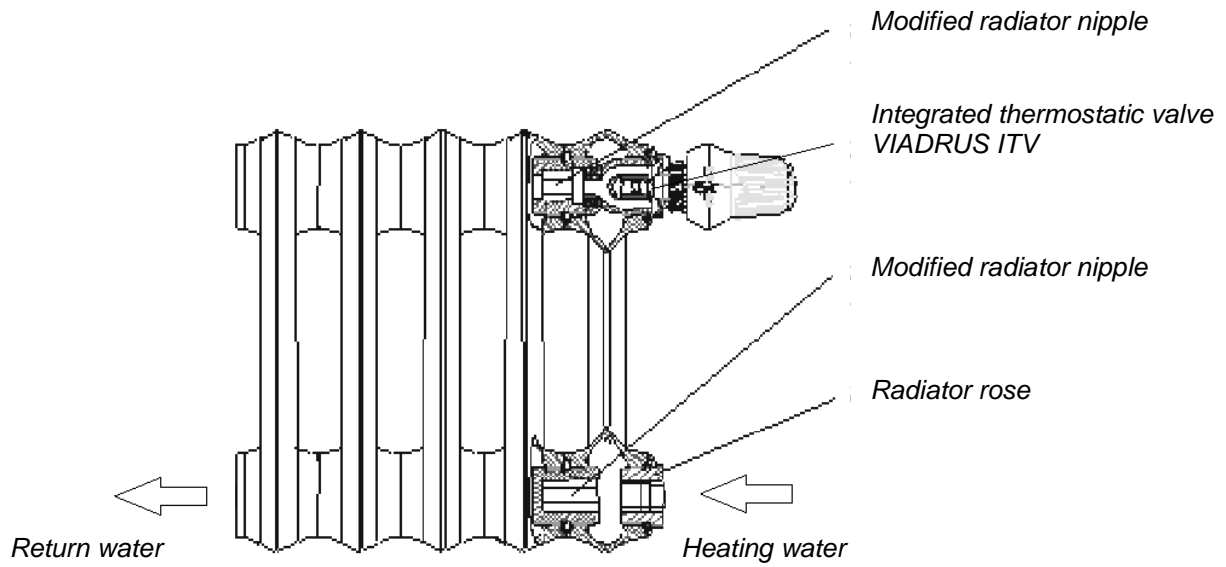
Schematic representation of two connected sections with integrated thermostatic valve and adjustable valve insert is illustrated on the following figure:



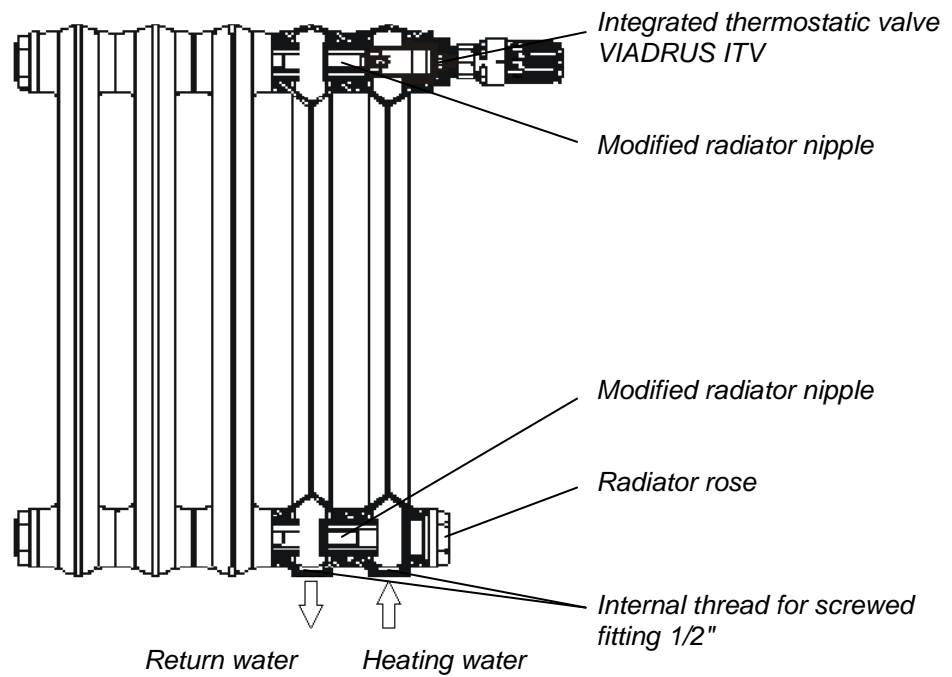
ADVANTAGES OF INTEGRATED THERMOSTATIC VALVE VIADRUS ITV:

- More advanced heating water connection
- Installation of integrated valve directly into heating body
- Simpler assembly of heating bodies
- Possibility of connecting the left and right

Integrated thermostatic valve “VIADRUS ITV” with adjustable valve insert “V” allows a different method of heating and return water connection, which is illustrated on figures below.



EXAMPLE OF A NEW INSTALLATION WITH INTEGRATED THERMOSTATIC VALVE (SIDE CONECTING)



EXAMPLE OF A NEW INSTALLATION WITH INTEGRATED THERMOSTATIC VALVE DANFOSS (BOTTOM CONECTING)

INTEGRATED THERMOSTATIC VALVE “VIADRUS ITV“

With adjustable insert “V“

A. TECHNICAL DESCRIPTION

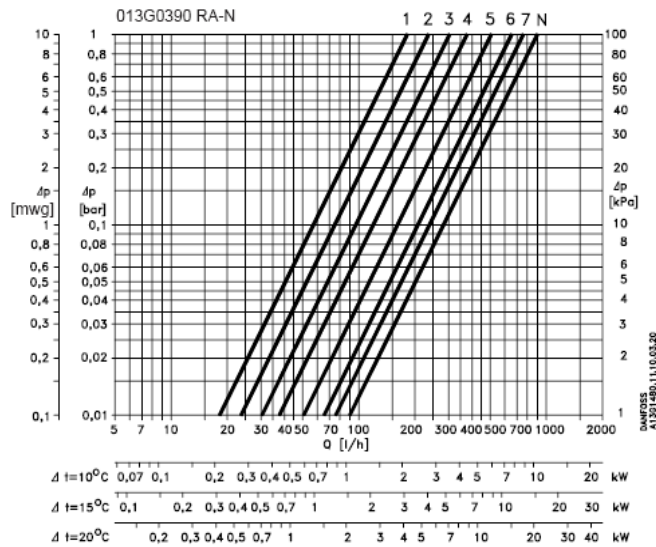
- For warm-water central heating systems with gravity and forced circulation of heating water
- For two-pipe heating systems with medium volume of heating water
- With stepless pre-control (infinitely adjustable) for medium volume of heating water
- Manual setting
- Noiseless
- k_v equal to 0.51
- Highest operating temperature of heating water below 120 °C
- Maximum operating pressure 8 bar
- Maximum differential pressure 2 bar
- Connection of heating body with ITV to all pipe sizes DN 10 – DN 20 (3/8", 1/2", 3/4")
- pH value of heating water from 4 up to 9.5
- Adjustable valve insert “V“
- Possibility of connecting the left and right



Fig. 1 Integrated thermostatic valve Danfoss

B. TECHNICAL DATA

Flow diagram for body of thermostatic valve V from firm Danfoss



Example of sizing (013G0390 RA-N)

Specified: flow rate 75 l/h
 To be found out: set-up at required pressure loss $\Delta p = 10 \text{ kPa} = 0,1 \text{ bar}$

The pressure loss looked for is obtained as a point of intersection of the flow line with selected valve parameter, e.g. at $X_p = 2 \text{ K}$.

Result: position 3

Supply number	Connecting head	Value k_v										Max. water temperature °C	Differential head		Pressure scale bar
		1	2	3	4	5	6	7	N	N	bar		bar		
013G0390	G 1/2"	0,14	0,21	0,26	0,32	0,46	0,59	0,73	0,87	1,0	5	120	0,05-0,2	0,6 max.	16

k_v flow rate – amount of heating fluid (heating water), which flows through the valve at given pre-control

P_p – 2nd zone of proportionality – change of required value in order to ensure shifting of actuator (valve) from one limit position to the other one.

2 K – 2 Kelvin temperature difference for operation of the valve (for apartments – 2, for industrial halls - 3)

RETRO VALVES

THE SET OF RETRO VALVE BOHEMIA WITH A THERMOSTATIC HEAD

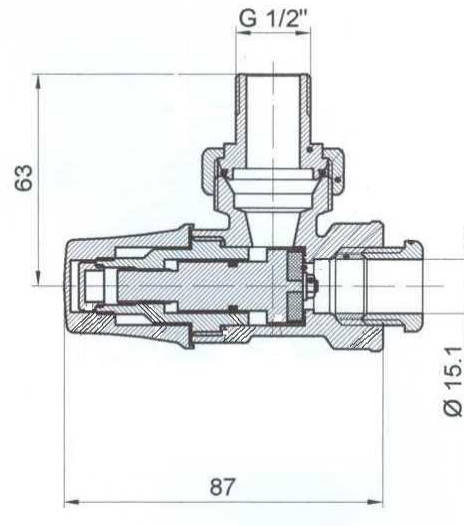
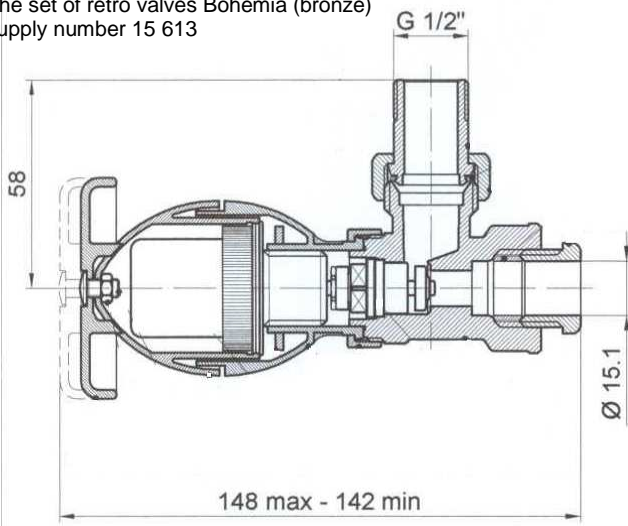


Fig. no. 1 Stop valve Bohemia

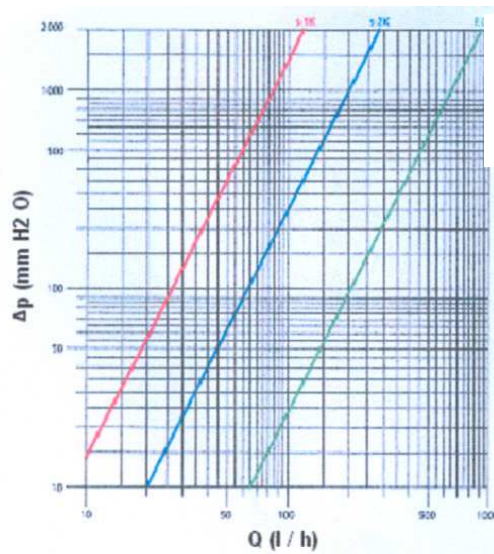


Fig. no. 2 Regulation valve Bohemia with the thermostatic head

The set of retro valves Bohemia (bronze)
supply number 15 613



Flow diagram of the retro valve Bohemia with a thermostatic head



	Kv
s-1K	0,26
s-2K	0,63
F.O.	2,06

C
1
F

THE SET OF RETRO VALVE BOHEMIA



Fig. no. 1 Stop valve Bohemia



Fig. no. 2 Regulation valve Bohemia

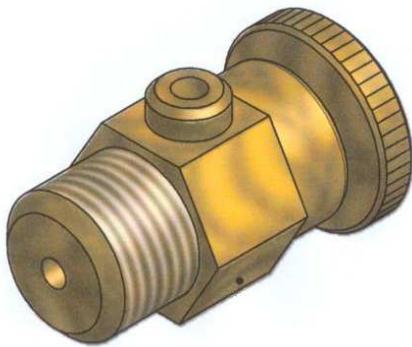
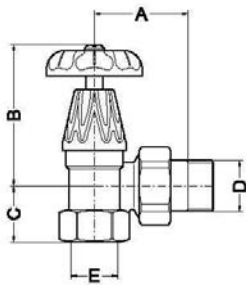


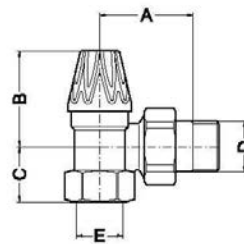
Fig. no. 3 Bleeder valve Bohemia

The set of retro valves Bohemia (anthracite):
Stop valve + regulation valve
supply number 14962

The set of retro valves Bohemia (bronze):
Stop valve + regulation valve + bleeder valve
supply number 14963

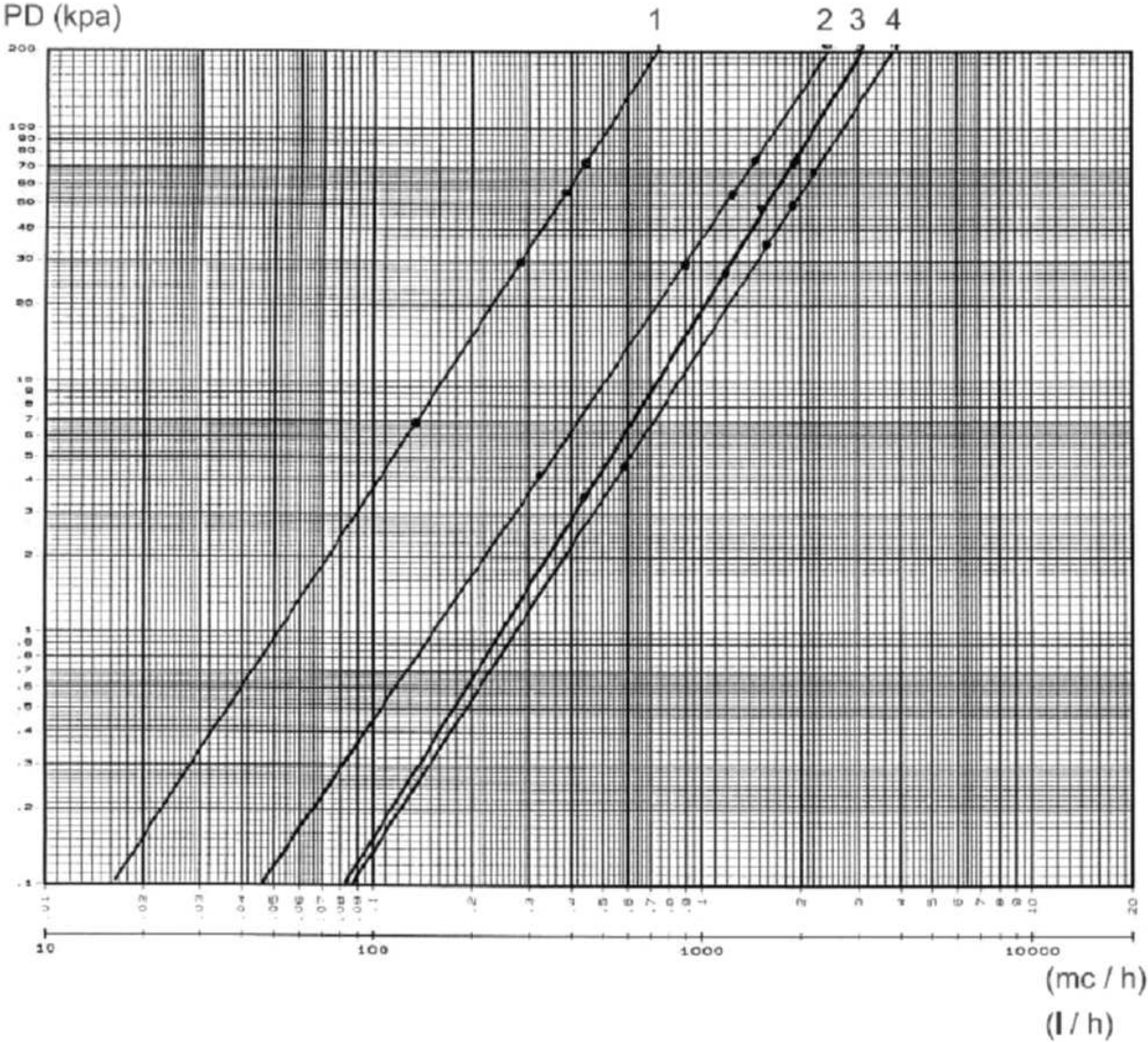


A	B	C	E
45	72	28.5	1/2" F



D	A	B	C	E
1/2"	45	49	28.5	1/2" F

Flow diagram of the retro valve Bohemia



	Kv
1	0,51
2	1,69
3	2,20
4	2,70

THE SET OF RETRO VALVE WITH A LEVER HEAD



Fig. no. 1 Lever stop valve



Fig. no. 2 Regulation valve

The set of retro valves with a lever head
supply number 15 713

ACCESSORIES

ACCESSORIES

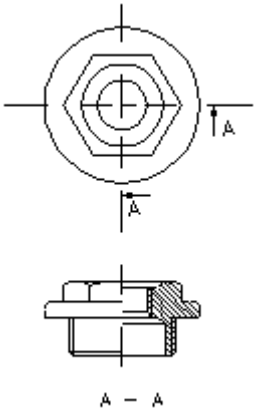
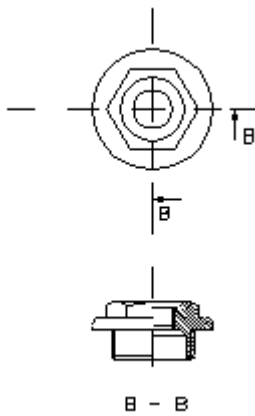
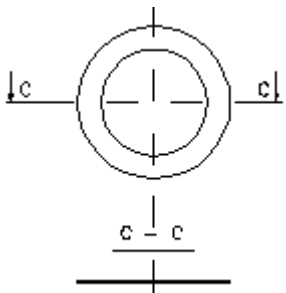
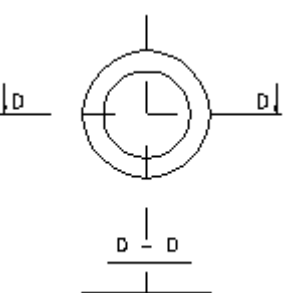
As accessories customers may order brackets and stand profiles according to article numbers. Roses, plugs and packing can be ordered using specific names indicated on Fig. 1 Accessories.

In addition to the above it is necessary to specify, whether the rose should be provided with left-hand or right-hand thread. Every set of radiator has 2 left-hand and 2 right-hand threads. In the front view of the radiator on the right-hand side there is the left-hand thread and on the left-hand side there is the right-hand thread.

Internal thread in the rose can be 3/8", 1/2", 3/4" or 1". Plug is a full rose.

KALOR, KALOR 3, BOHEMIA BOHEMIA R, HELLAS

TERMO, STYL

	
<p>ROSE 5/4" WITH 3/4" INTERNAL THREAD Supply number 2503 left Supply number 2502 right</p> <p>ROSE 5/4" WITH 1/4" INTERNAL THREAD Supply number 2497 left Supply number 2498 right</p> <p>ROSE 5/4" WITH 1/2" INTERNAL THREAD Supply number 2500 left Supply number 2499 right</p> <p>ROSE 5/4" WITH 3/8" INTERNAL THREAD Supply number 2953 left Supply number 2952 right</p> <p>ROSE 5/4" WITH 1/8" INTERNAL THREAD Supply number 3417 left Supply number 3418 right</p> <p>ROSE 5/4" WITH 1" INTERNAL THREAD Supply number 8317 left Supply number 8318 right</p>	<p>ROSE 1" WITH 3/4" INTERNAL THREAD Supply number 2884 left Supply number 2885 right</p> <p>ROSE 1" WITH 1/4" INTERNAL THREAD Supply number 2881 left Supply number 2880 right</p> <p>ROSE 1" WITH 1/2" INTERNAL THREAD Supply number 2883 left Supply number 2882 right</p> <p>ROSE 1" WITH 3/8" INTERNAL THREAD Supply number 2879 left Supply number 2878 right</p> <p>ROSE 1" WITH 1/8" INTERNAL THREAD Supply number 3405 left Supply number 3404 right</p>
	
<p>CLINGERITE PACKING 60 x 42 x 1 mm Supply number 9686</p>	<p>CLINGERITE PACKING 50 x 33 x 1 mm Supply number 9689</p>

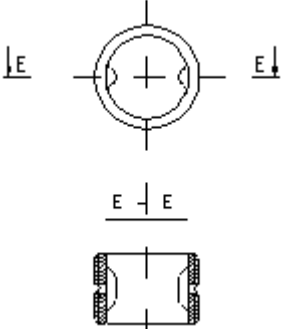
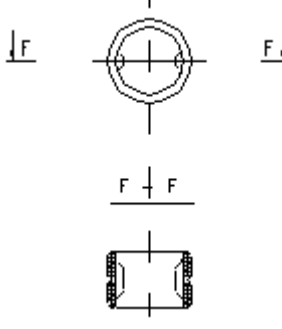
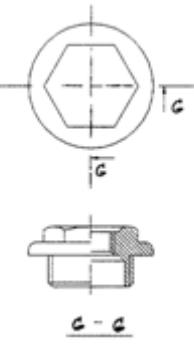
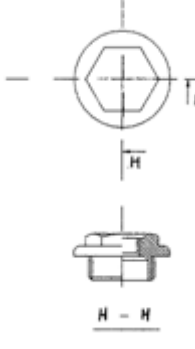
	
<p>RADIATOR NIPPLE G 5/4" Supply number 2493</p>	<p>RADIATOR NIPPLE G 1" Supply number 2494</p>
	
<p>ROSE 5/4" PLUG Supply number 2495 left Supply number 2496 right</p>	<p>ROSE 1" PLUG Supply number 2876 left Supply number 2877 right</p>
<p>STRIPPING SPANNER Supply number 3251</p>	<p>STRIPPING SPANNER TERMO Supply number 3252</p>

Fig. 1 Accessories

We recommend to fix the heating bodies using one of the following methods

Installation of Bohemia, Bohemia R and Hellas heating bodies should be performed by their positioning on the feet of the body.

For the radiators Kalor, Kalor 3, Termo and Styl we do recommend hangers of the firm WEMEFA (Sales agency WEMEFA, Mr. Lát, Gorkého 1577, 53002 Pardubice, tel: +420466304133, cell: +420602483036, info@obzaho.com, www.obzaho.com)

1. Utilization of special brackets with holders and spacers – WEMEFA set no. 3

They are used similarly to pipe brackets for fixation of heating bodies to solid walls. Their advantage consists especially in significantly simpler and quicker installation (when drilling holes for brackets it is not necessary to maintain accurate spacing and width of sections in sets). This allows a very simple installation of all types and sizes of heating bodies manufactured.

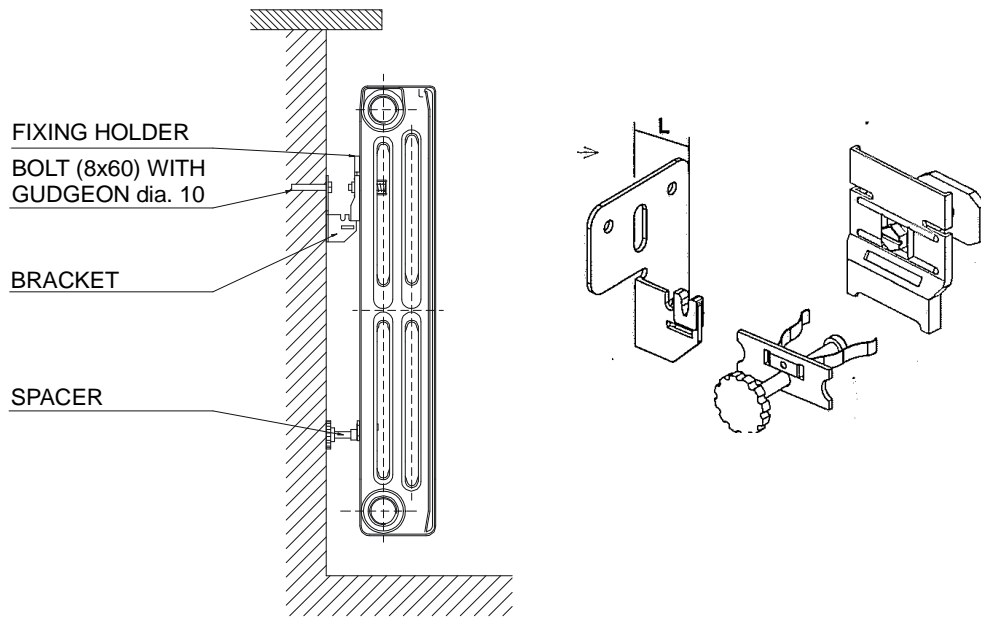


Fig. 2 Fixation of heating bodies using brackets with fixing holders

Table 1 Number of brackets with fixing holders depending on dimension of sections

Dimensions of sections (mm)	Number of sections														
	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Kalor 500/70			2				2			2		2	2	3	3
Kalor 500/110															
Kalor 3 500/70			2				2			2		2	3	3	3
Termo 500/95															
Kalor 350/160															
Kalor 900/70															
Kalor 3 350/160			2				2			2		3	3	3	3
Kalor 3 500/110															
Termo 623/95															
Kalor 500/160															
Kalor 600/160															
Kalor 3 900/70			2				2			3		3	3	3	3
Termo 500/130															
Kalor 500/220															
Kalor 3 500/160															
Termo 623/130			2				2			3		3	3	3	3
Termo 813/95															
Termo 813/130			2				3			3		3	3	4	4
Kalor 900/160			2				3			3		4	4	4	5

2. Screw brackets with fixing holders and spacers are designed for fixation of heating bodies into hollow walls – WEMEFA set no. 4

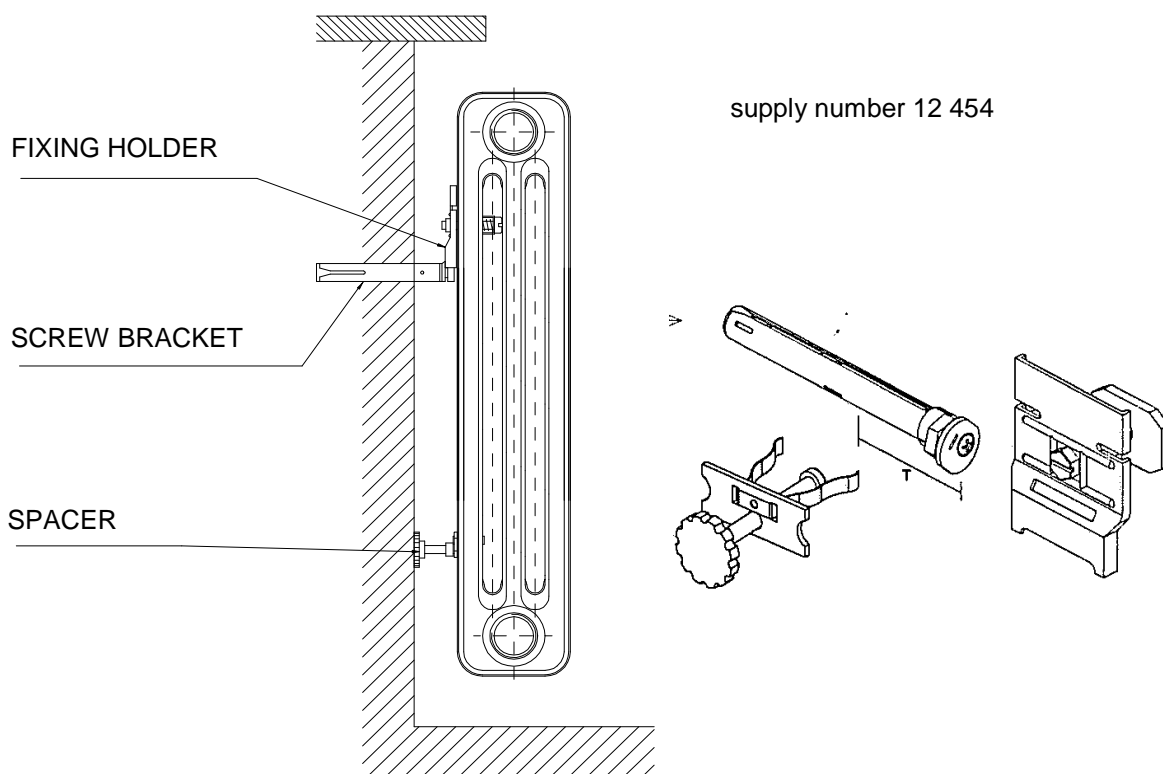


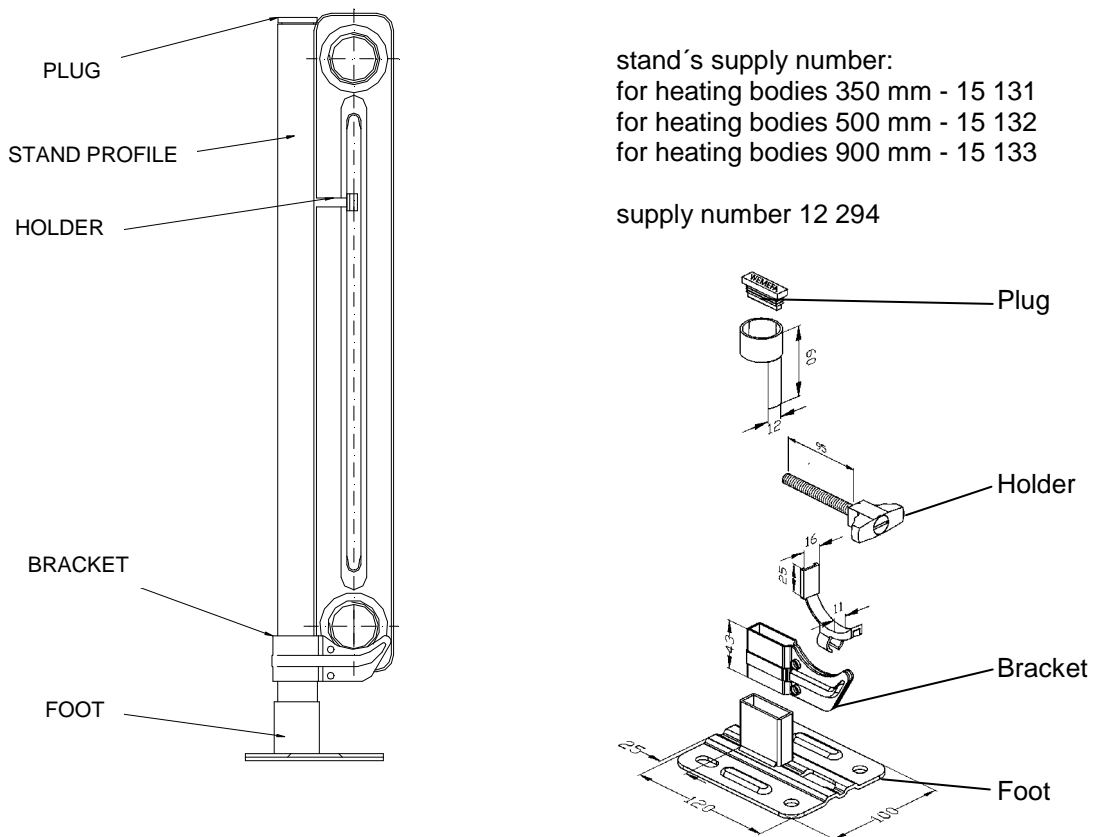
Fig. 3 Fixation of heating bodies into hollow walls using screw brackets

Table 2 Number of screw brackets with fixing holders depending on dimension of sections

Dimensions of sections (mm)	Number of sections														
	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Kalor 500/70		2				2		3			3	3	3	3	
Kalor 500/110															
Kalor 3 500/70		2				3		3		3	3	4	4		
Termo 500/95															
Kalor 350/160															
Kalor 900/70															
Kalor 3 350/160		2				3		3		3	4	4	4		
Kalor 3 500/110															
Termo 623/95															
Kalor 500/160															
Kalor 600/160		2		3		3		3		4	4	4	4	4	5
Kalor 3 900/70															
Termo 500/130															
Kalor 500/220															
Kalor 3 500/160		2		3		3		4		4	4	4	4	5	5
Termo 623/130															
Termo 813/95															
Termo 813/130		2		3		3		4		4	4	4	5	5	5
Kalor 900/160		2		3		4		4		5	6	6	6	6	6

3. Fixation of heating bodies to a stand – WEMEFA set no. 7

Indicated method is suitable for manufactured models Kalor, Kalor 3 and Termo. We recommend to use it in rooms with plasterboard partition walls or facing and in all places where it is impossible to apply fixation according to point 1 – 3. Foot of the stand can be fixed into the floor by screwing down or embedding in concrete, e.g. for sizes 900/160, 900/70 and so on. It is necessary to specify the size of a heating body when placing your order.



stand's supply number:
 for heating bodies 350 mm - 15 131
 for heating bodies 500 mm - 15 132
 for heating bodies 900 mm - 15 133

supply number 12 294

Fig. 4 Fixation of heating bodies using stand

Table 3 Number of stands depending on dimensions of sections

Dimensions of sections (mm)	Number of sections														
	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Kalor 500/70		2				2		3			3	3	3	3	
Kalor 500/110		2				3		3			3	3	4	4	
Kalor 3 500/70		2				3		3			3	4	4	4	
Termo 500/95		2				3		3			3	4	4	4	
Kalor 350/160		2				3		3			3	4	4	4	
Kalor 900/70		2				3		3			3	4	4	4	
Kalor 3 350/160		2				3		3			3	4	4	4	
Kalor 3 500/110		2				3		3			3	4	4	4	
Kalor 500/160		2				3		3			3	4	4	4	
Kalor 600/160		2				3		3			3	4	4	4	
Kalor 3 900/70		2				3		3			3	4	4	4	
Termo 500/130		2				3		3			3	4	4	4	
Kalor 500/220		2				3		3			3	4	4	4	
Kalor 3 500/160		2				3		3			3	4	4	4	
Kalor 900/160		2				3		3			3	4	4	4	

4. Using classic radiator pipe brackets and holders

These can be used for fixation of bodies on solid walls. This method is suitable for types **KALOR**, **KALOR 3**, **TERMO**, **lover bracket STYL**.

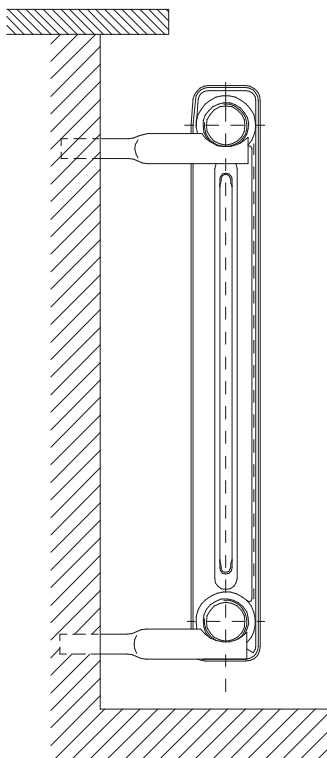


Fig. 5 Fixation of heating sections using pipe brackets and holders

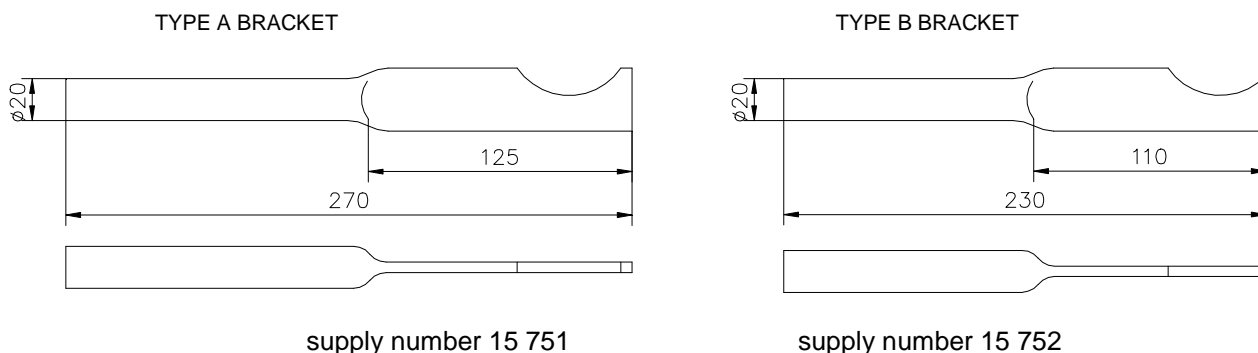


Fig. 6 Radiator pipe brackets and holder

Selection of a bracket is made based on depth of heating bodies, see Table 4. Number of brackets depending on dimensions and number of sections is indicated in Table 5.

Table 4 Recommended types of pipe brackets according to type of heating bodies

Bracket type	Heating body size (spacing / depth)
A	Kalor 350/160, Kalor 500/70, Kalor 500/110, Kalor 500/160, Kalor 500/220, Kalor 600/160, Kalor 900/160, Kalor 900/70, Hellas 270, Hellas 470
	Kalor 3 350/160, Kalor 3 500/110, Kalor 3 500/160, Kalor 3 900/160
	Termo 500/95, Termo 500/130, Termo 623/95, Termo 623/130, Termo 813/95, Termo 813/130, Styl 500/130
B	Kalor 3 500/70, Kalor 3 900/70

Table 5 Number of pipe brackets depending on dimensions of sections

Dimensions of sections (mm)		Number of sections														
		3	4	6	8	10	12	14	16	18	20	22	24	26	28	29	30
Kalor	500/70	2+1		2+2		2+2			3+3			3+3	3+3	4+4	4+4	
Kalor	500/110	2+1		2+2		2+2			3+3			3+3	3+3	4+4	4+4	
Kalor 3	500/70	2+1		2+2		2+2			3+3			3+3	3+3	4+4	4+4	
Termo	500/95	2+1		2+2		2+2			3+3			3+3	3+3	4+4	4+4	
Kalor	350/160	2+1		2+2		2+2			3+3			3+3	3+3	4+4	4+4	
Kalor	900/70	2+1		2+2		2+2			3+3			3+3	3+3	4+4	4+4	
Kalor 3	350/160	2+1		2+2		2+2			3+3			3+3	3+3	4+4	4+4	
Kalor 3	500/110	2+1		2+2		2+2			3+3			3+3	3+3	4+4	4+4	
Termo	623/95	2+1		2+2		2+2			3+3			3+3	3+3	4+4	4+4	
Kalor	500/160	2+1		2+2		2+2			3+3			3+3	4+4	4+4	4+4	
Kalor	600/160	2+1		2+2		2+2			3+3			3+3	4+4	4+4	4+4	
Kalor 3	900/70	2+1		2+2		2+2			3+3			3+3	4+4	4+4	4+4	
Termo	500/130	2+1		2+2		2+2			3+3			3+3	4+4	4+4	4+4	
Kalor 3	500/160	2+1		2+2		2+2			3+3			3+3	4+4	4+4	4+4	
Termo	623/130	2+1		2+2		2+2			3+3			3+3	4+4	4+4	4+4	
Termo	813/95	2+1		2+2		2+2			3+3			3+3	4+4	4+4	4+4	
Termo	813/130	2+1		2+2		2+2			3+3			3+3	4+4	4+4	4+4	
Kalor	500/220	2+1		2+2		2+2			3+3			3+3	4+4	4+4	4+4	
Kalor	900/160	2+1		2+2		3+3			4+4			5+5	5+5	5+5	6+6	
Styl	500/130	2+1		2+2		2+2			3+3			3+3	4+4	4+4	4+4	
Hellas	270	2+1		2+2		2+2			3+3			3+3	4+4	4+4	4+4	
Hellas	470	2+1		2+2		2+2			3+3			3+3	4+4	4+4	4+4	

5. Clamping by means of the screw consoles

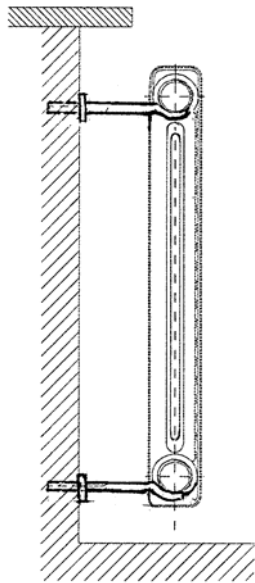
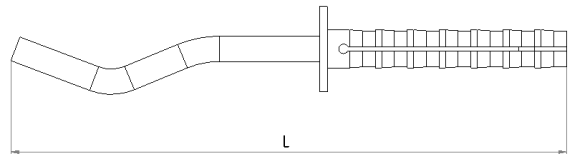


Fig. 7 Clamping by means of the screw consoles



supply number
 12 559 12 x 200 mm
 12 560 12 x 230 mm
 12 561 12 x 260 mm

Fig. 8 Screw console

Table 6 Number of brackets depending on dimensions of sections

Dimensions of brackets (mm)	Dimensions of sections (mm)	Number of elements															
		3	4	6	8	10	12	14	16	18	20	22	24	26	28	29	30
200	Kalor 500/70	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
200	Kalor 500/110	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
200	Termo 500/95	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
230	Kalor 350/160	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
200	Kalor 900/70	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
230	Kalor 3 350/160	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
200	Kalor 3 500/110	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
230	Termo 623/95	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
230	Kalor 500/160	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
230	Kalor 600/160	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
230	Termo 500/130	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
230	Kalor 3 500/160	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
230	Termo 623/130	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
230	Termo 813/95	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
230	Termo 813/130	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
260	Kalor 500/220	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
230	Kalor 900/160	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				
230	Styl 500/130	2+1		2+2		2+2		3+3		3+3	3+3	4+4	4+4				

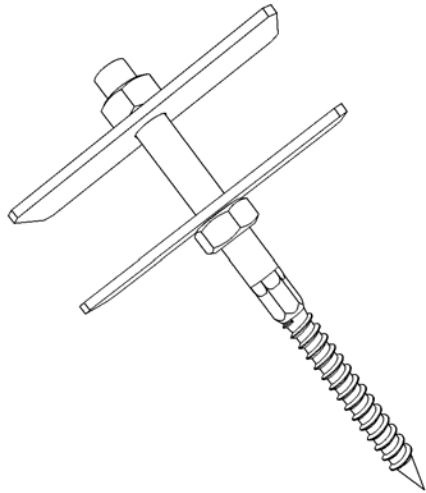
Bohemia, Bohemia R and Hellas

Dimensions of brackets (mm)	Dimensions of sections (mm)	Number of elements															
		3	4	6	8	10	12	14	16	18	19	22	24	26	28	30	
260	BOHEMIA 450/220	2+2		2+2		3+3		4+4									
260	BOHEMIA R 450/225	2+2		2+2		3+3		4+4									
260	BOHEMIA 800/200	2+2	2+2	2+2	3+3	3+3	4+4	4+4	5+5	5+5	5+5						
260	HELLAS 270	2+1	2+1	2+1	2+2	2+2	2+2	2+2	3+3			3+3	3+3	4+4	4+4		
260	HELLAS 470	2+1	2+1	2+1	2+2	2+2	2+2	2+2	3+3			3+3	3+3	4+4	4+4		

By customer´s request there can be fit together the required battery out of the mid-links and attached to the wall by means of the consoles.

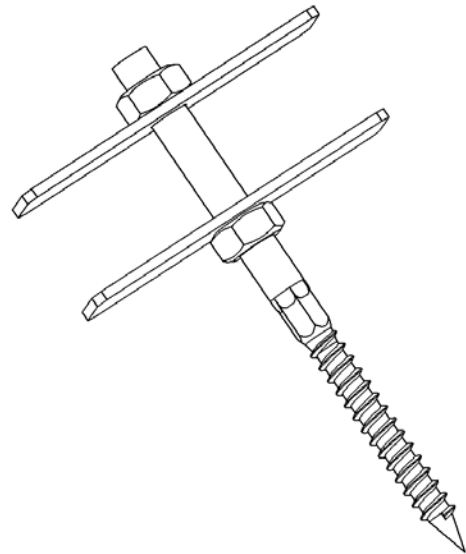
6. Upper gripping of KALOR, KALOR 3, TERMO and STYL radiator

Due to the access to this mounting it is **necessary** to position the upper clamping between the first and second column of the radiator.



supply number 11486

Fig. 9 Upper gripping of Kalor, Kalor 3, Termo and Styl radiator – length 140 mm



supply number 14 331

Fig. 10 Upper gripping of Termo radiator – length 180 mm

Table 7 Number of upper gripping depending on dimensions of sections

Dimensions of sections (mm)	Number of elements														
	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Kalor 500/70			2					2		2	2	2	2	2	2
Kalor 900/70			2					2		2	2	2	2	2	2
Kalor 350/160			2					2		2	2	2	2	2	2
Kalor 500/110			2					2		2	2	2	2	2	2
Kalor 500/160			2					2		2	2	2	2	2	2
Kalor 500/220			2					2		2	2	2	2	2	2
Kalor 600/160			2					2		2	2	2	2	2	2
Kalor 900/160			2					2		2	2	2	2	2	2
Kalor 3 350/160			2					2		2	2	2	2	2	2
Kalor 3 500/70			2					2		2	2	2	2	2	2
Kalor 3 500/110			2					2		2	2	2	2	2	2
Kalor 3 500/160			2					2		2	2	2	2	2	2
Kalor 3 900/70			2					2		2	2	2	2	2	2
Termo 500/130			2					2		2	2	2	2	2	2
Termo 623/130			2					2		2	2	2	2	2	2
Termo 813/130			2					2		2	2	2	2	2	2
Styl 500/130			2					2		2	2	2	2	2	2

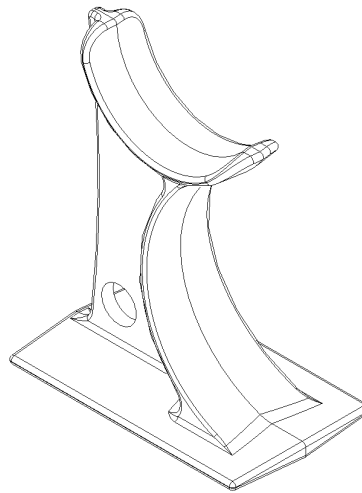
Table 8 Number of upper gripping depending on dimensions of sections

Dimensions of sections (mm)	Number of elements														
	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Termo 500/95			2					2		2	2	2	2	2	2
Termo 623/95			2					2		2	2	2	2	2	2
Termo 813/95			2					2		2	2	2	2	2	2

7. Support under KALOR and KALOR 3 heating body

This fixation method is used for **KALOR** and **KALOR 3** heating bodies in combination with holders.

Dimensions of support:
 Height 123 mm
 Width 60 mm
 Depth 100 mm



supply number 9213

Fig. 11 Support under heating bodies KALOR and KALOR 3

Table 9 Number of supports depending on dimensions of sections KALOR

Dimensions of sections (mm)	Number of sections														
	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Kalor 350/160			2					3		4	4	4	5	5	
Kalor 500/70			2					3		4	4	4	5	5	
Kalor 500/110			2					3		4	4	4	5	5	
Kalor 500/160			2					3		4	4	4	5	5	
Kalor 500/220			2					3		4	4	4	5	5	
Kalor 900/70			2					3		4	4	4	5	5	
Kalor 900/160			2					3		4	4	4	5	5	

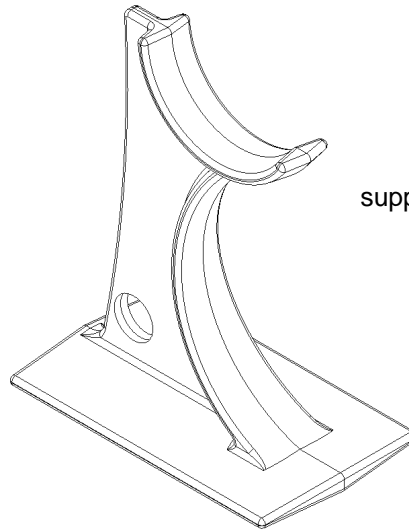
Table 10 Number of supports depending on dimensions of sections KALOR 3

Dimensions of sections (mm)	Number of sections														
	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Kalor 3 350/160			2					3		4	4	4	5	5	
Kalor 3 500/70			2					3		4	4	4	5	5	
Kalor 3 500/110			2					3		4	4	4	5	5	
Kalor 3 500/160			2					3		4	4	4	5	5	
Kalor 3 900/70			2					3		4	4	4	5	5	

8. Support under STYL and TERMO heating body

Dimensions of support:

Height 118,5 mm
 Width 60 mm
 Depth 100 mm



supply number 11 485

Fig. 12 Support under heating bodies STYL and TERMO

Table 11 Number of supports depending on dimensions of sections TERMO

Dimensions of sections (mm)	Number of elements														
	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Termo 500/95			2					3		4	4	4	5	5	
Termo 500/130			2					3		4	4	4	5	5	
Termo 623/95			2					3		4	4	4	5	5	
Termo 623/130			2					3		4	4	4	5	5	
Termo 813/95			2					3		4	4	4	5	5	
Termo 813/130			2					3		4	4	4	5	5	

Table 12 Number of supports depending on dimensions of sections STYL

Dimensions of sections (mm)	Number of elements														
	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Styl 500/130			2					3		4	4	4	5	5	

ALUMINIUM RADIATORS

RESIDENCE

RESIDENCE

DESCRIPTION

Aluminium alloy heating elements with a reduced water volume and extended face transfer surface forming a panel surface, connected into radiators by means of steel inserts with G 1" external right-hand & left-hand thread are manufactured in four types:

350/85 mm, 500/85 mm, 500/100 mm, 600/90 mm

The radiators correspond to EN 442 – 1 alteration A1. Radiators are made of siluminium AlSi12Cu2 - special aluminium alloy. This alloy is stable, homogeneous and nonporous plus chemically and electrically neutral towards other metals in the heating system. Radiators thanks to their special chemical composition are suitable for a trouble-free combination with copper, iron and plastic systems. They work at pH between 6 and 7. The castings guarantee a long service life of products.

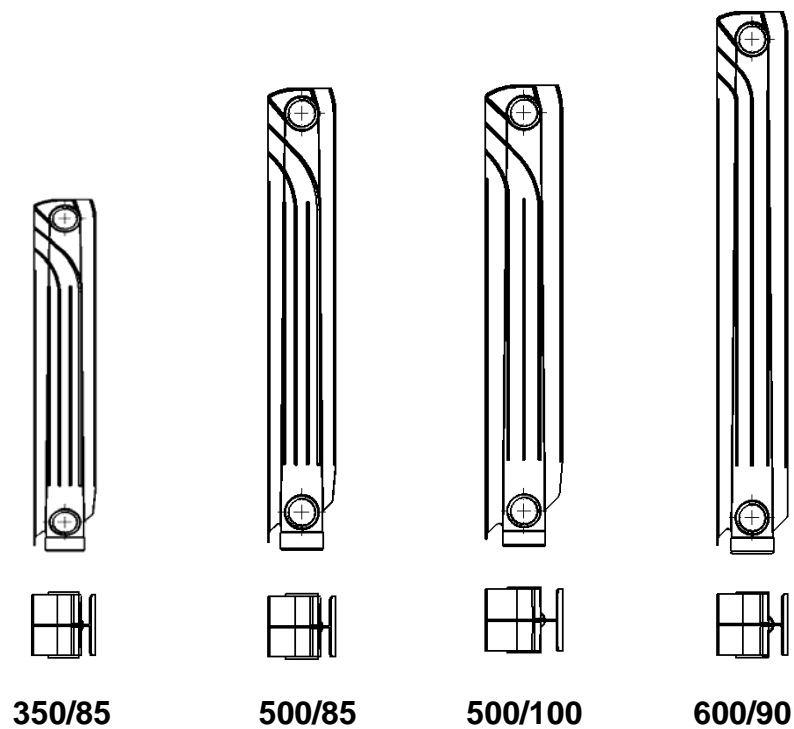


Fig.no.1 Residence type heating elements

USAGE

All Residence type radiators are destined for hot water central heating systems both with gravity and forced heating water circulation with the maximum operating temperature lower than 110 °C and **maximum operating overpressure up to 1,6 MPa.**

THERMAL - TECHNICAL PARAMETERS

Environment: These radiators can be used in the environment from +2 °C to +35 °C.

Tab.no.1 The principal thermal – technical parameters of Residence heating elements

Characteristic	Brand	Unit	350/85	500/85	500/100	600/90
Identification number			44	45	46	47
total height	H	(mm)	430	580	580	680
spacing	h	(mm)	350	500	500	600
depth	B	(mm)	85	85	96	90
width	L	(mm)	82,5	82,5	82,5	82,5
connecting thread	G	"	1	1	1	1
weight	M	(kg/el.)	1,08	1,25	1,35	1,50
water volume	V	(dm ³ /el.)	0,27	0,38	0,41	0,45
heat output	Q _{Tn}	(W/el.)	107,8	144,51	146,74	166,89

All Residence types are certified in SZÚ and thermal – technical parameters are experimentally tested according to EN 442-2.

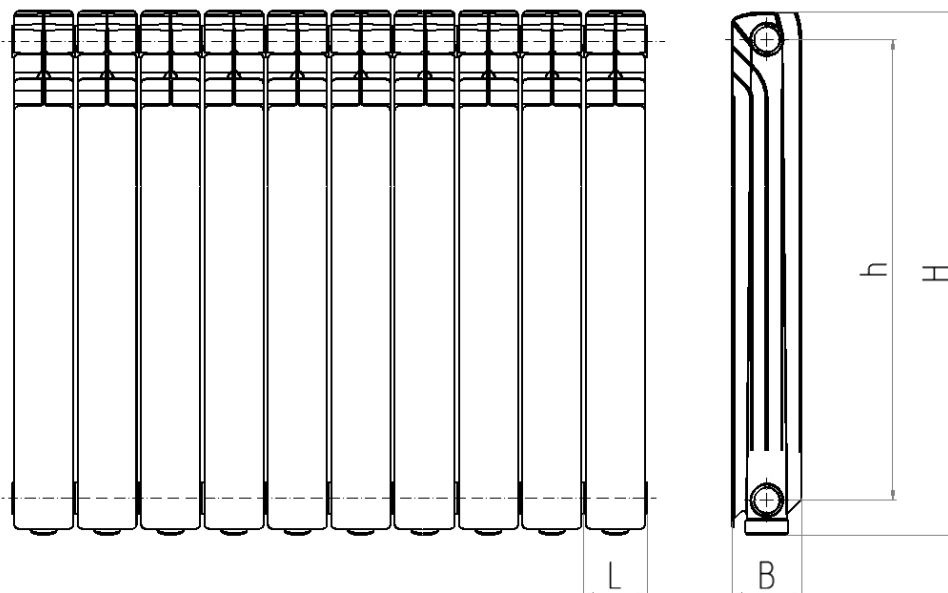


Fig.no.2 Principal dimensions of Residence elements

The principal thermal – technical parameters for water as the heat carrier with **90/70 °C temperature gradient** and single-sided connection (inlet) of water as the heat carrier at the top are shown in table no. 1. The individual types of radiators are measured without cover.

TEST OVERPRESSURE

At the manufacturer's the manufactured sets are exposed to the pressure test by applying 2,4 MPa cold water overpressure (for max. 1,6 MPa operating overpressure).

MOUNTING

When mounting individual radiators their position according to Fig. no.3 plus **minimum window-sill overlap** must be observed in order to achieve the maximum heat outputs.

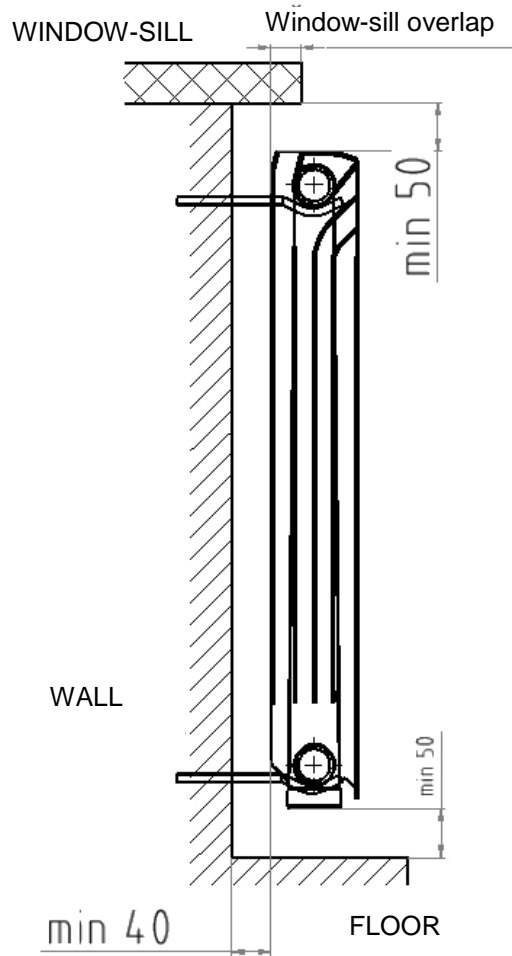


Fig.no.3 Mounting of Residence radiators

The rosettes with G1"external thread are used for Residence radiators connection to the distribution pipe. When looking at the face panel surface the radiators are mounted from the left-hand side with the right-threaded rosette for heat carrier (water) connection and from the right-hand side with left-threaded rosette for G 1 heat carrier (water) outlet. The upper plug on the opposite side of heat carrier (water) connection can be equipped with drilling with eccentrically positioned G 1/2" thread for the bleed valve. It is suitable to use automatic bleed valves. Before connection (maximum number of 20 sections) of individual supplied sets into required size of radiators the bearing surfaces between elements and connection must be sealed with sealing material (Temasil) that by default is used in production and is suitable both for hot water and steam systems. The elements are tightened by means of steel inserts and applying min.50 Nm, max. 100 Nm gyroscopic moment. The gyroscopic moment for rosettes tightening varies between 50 Nm and 100 Nm. Other data regarding the mounting instructions are stated in the common part of manual for all types of produced radiators

SUPPLEMENTARY DATA

The external surface of heating bodies shall be provided with a final paint prior to their putting into operation.

Thermal power changes if other heat-transfer fluid than the bodies were verified for (e.g. anti-free mixture) is used. Thus, utilization of such mixtures shall be consulted with the manufacturer of radiators.

Aluminium radiators can be used with water at normal pH. For a longer service life we recommend using water at pH between 6 and 7. If pH is between 7 and 9.5 (slightly alkaline), then the use of bimetal radiators is recommended because the steel pipes resistance against corrosion is higher than that of aluminium pipes.

We recommend to add inhibitors to the heat carrying medium (e.g. INHICOR I, II).

The class of reaction to fire A1

SURFACE FINISHING

Finishing of Residence radiators is done with a powder coating in RAL 9010

INSTALLATION INSTRUCTIONS

If the cast-iron heating bodies are used for central heating systems with forced circulation of heating water it is advisable to perform flushing of the system (preferably three times) prior to turning the pump on. This will ensure removal of all impurities, avoid clogging of ceramic plates of the pump and ensure long-term trouble-free operation.

PACKAGING, TRANSPORT, STORAGE

Ten-section radiators are delivered on a pallet in cardboard boxes. The sets shall be secured against shifting during transport properly. Customer shall store the products in such a way to protect them against climatic effects. The same principles apply to storage as applicable to transport.

Handling of sets should be done carefully to avoid their damage.

ORDERING

Purchase order shall include the following data:










- type of heating body
- connection spacing and depth
- supply number
- accessories according to the ordering code


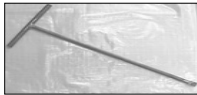

Type	Dimension h / B **	Wattage (W/pc) 90/70/20°C	Ordering code
Residence	350/85	107,8	16 054
Residence	500/85	144,51	16 055
Residence	500/100	146,74	16 056
Residence	600/90	166,89	16 057

*) connecting thread 1"; delivery of 10-ti piece sets in the final surface finish in a cardboard container

***) h - spacing of the connecting holes, B - depth of the radiator

ACCESSORIES

Ordering code	Name	
Sets for Residence and Duostar radiators		
16 060	13-piece set 3/4" (it includes: 4x rosette, 3x bracket, 3x dowel, 1x bleeder valve, 1x small key, 1x plug)	
16 061	13-piece set 1/2" (it includes: 4x rosette, 3x bracket, 3x dowel, 1x bleeder valve, 1x small key, 1x plug)	
16 062	11-piece set 3/4" (it includes: 4x rosette, 2x bracket, 2x dowel, 1x bleeder valve, 1x small key, 1x plug)	
16 063	11-piece set 1/2" (it includes: 4x rosette, 2x bracket, 2x dowel, 1x bleeder valve, 1x small key, 1x plug)	
Rosette 1"		
16 064	Rosette 1" x 1/2" left	
16 065	Rosette 1" x 1/2" right	
16 066	Rosette 1" x 3/4" left	
16 067	Rosette 1" x 3/4" right	
16 068	Rosette 1" full left	
16 069	Rosette 1" full right	
Nipples		
16 070	radiator nipple 1"	
Plugs		
16 072	Plug 3/4"	
16 073	Plug 1/2"	
Bleeder valves		
16 071	Bleeder valve 1/2"	
Brackets		
16 074	Fixation bracket big (set of 2 pc brackets)	
16 075	Fixation bracket small (set of 2 pc brackets)	
16226	Bracket with a dowel	

Ordering code	Name	
Keys		
16 227	Tightening key for rosettes (plastic)	
16 228	Pull-off key	
Sealing		
16 229	Sealing 1"	

Note: 1 upper bracket and 2 lower brackets are fastened for the 10-cell battery.

Number of consoles depends on the size of cells

Dimensions of sections (mm)	Number of elements														
	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Residence 350/85			3				3			3		3	3	6	6
Residence 500/85			3				3			3		3	3	6	6
Residence 500/100			3				3			3		3	3	6	6
Residence 600/90			3				3			3		3	3	6	6

DELIVERY TIME

- **14 days**

The delivery time begins on receipt of the binding order. In case the ordered goods aren't in stock the seller informs the buyer and at same time he will inform him about the preliminary delivery date.

WARRANTY

Manufacturer provides 10 years warranty covering production defects on heating systems delivered. The warranty period starts as of the ex-works shipment date from Viadrus division.

THERMAL POWER TABLES FOR INDIVIDUAL MODELS OF HEATING BODIES

WARM-WATER HEATING

Temperature gradient to EN 442 – 2

Temperature gradients 90/70 °C
 75/65 °C
 55/45 °C

Table 2

Thermal power of heating bodies RESIDENCE 350/85 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 90 \text{ }^\circ\text{C}$

$t_{W2} = 70 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	316	287	269	258	246	233
3	444	403	378	362	346	327
4	572	519	487	466	446	421
5	700	634	596	571	546	516
6	828	750	705	675	645	610
7	956	866	814	779	745	704
8	1084	982	923	883	845	798
9	1212	1098	1032	988	944	893
10	1340	1214	1141	1092	1044	987
11	1468	1330	1250	1196	1144	1081
12	1596	1446	1358	1301	1244	1175
13	1723	1562	1467	1405	1343	1270
14	1851	1678	1576	1509	1443	1364
15	1979	1794	1685	1614	1543	1458
16	2107	1910	1794	1718	1642	1552
17	2235	2026	1903	1822	1742	1647
18	2363	2142	2012	1926	1842	1741
19	2491	2258	2121	2031	1941	1835
20	2619	2374	2230	2135	2041	1929
21	2747	2490	2339	2239	2141	2024
22	2875	2606	2448	2344	2241	2118
23	3003	2722	2557	2448	2340	2212
24	3131	2838	2666	2552	2440	2306
25	3259	2954	2775	2656	2540	2401
26	3387	3070	2883	2761	2639	2495
27	3515	3186	2992	2865	2739	2589
28	3643	3302	3101	2969	2839	2683
29	3771	3418	3210	3074	2939	2778
30	3898	3534	3319	3178	3038	2872

Table 3

Thermal power of heating bodies RESIDENCE 350/85 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 75\text{ °C}$

$t_{W2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	258	230	213	202	192	181
3	362	323	299	284	269	255
4	466	416	386	366	347	328
5	571	508	472	448	424	401
6	675	601	558	530	502	475
7	779	694	645	612	580	548
8	883	787	731	694	657	621
9	988	880	817	776	735	695
10	1092	973	903	858	812	768
11	1196	1066	990	940	890	841
12	1301	1159	1076	1021	968	915
13	1405	1252	1162	1103	1045	988
14	1509	1345	1248	1185	1123	1061
15	1614	1438	1335	1267	1200	1135
16	1718	1531	1421	1349	1278	1208
17	1822	1624	1507	1431	1356	1281
18	1926	1717	1594	1513	1433	1355
19	2031	1810	1680	1595	1511	1428
20	2135	1902	1766	1677	1588	1501
21	2239	1995	1852	1759	1666	1575
22	2344	2088	1939	1840	1744	1648
23	2448	2181	2025	1922	1821	1721
24	2552	2274	2111	2004	1899	1795
25	2656	2367	2197	2086	1976	1868
26	2761	2460	2284	2168	2054	1941
27	2865	2553	2370	2250	2131	2015
28	2969	2646	2456	2332	2209	2088
29	3074	2739	2543	2414	2287	2161
30	3178	2832	2629	2496	2364	2235

Table 4

Thermal power of heating bodies RESIDENCE 350/85 depending on required air temperature and number of sections

Warm-water heating

$t_{w1} = 55 \text{ }^\circ\text{C}$

$t_{w2} = 45 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	151	126	112	103	93	84
3	211	177	157	144	131	118
4	272	228	203	186	168	152
5	333	279	248	228	206	186
6	394	330	293	269	243	220
7	455	381	339	311	281	254
8	516	432	384	352	319	288
9	577	483	429	394	356	322
10	638	535	475	436	394	356
11	699	586	520	477	431	390
12	760	637	565	519	469	424
13	821	688	611	561	507	458
14	882	739	656	602	544	492
15	943	790	701	644	582	526
16	1004	841	747	685	619	560
17	1065	892	792	727	657	594
18	1125	943	837	769	695	628
19	1186	994	883	810	732	662
20	1247	1045	928	852	770	696
21	1308	1096	973	893	807	730
22	1369	1147	1019	935	845	764
23	1430	1198	1064	977	883	798
24	1491	1249	1109	1018	920	832
25	1552	1300	1155	1060	958	866
26	1613	1351	1200	1102	995	900
27	1674	1402	1245	1143	1033	934
28	1735	1453	1291	1185	1071	968
29	1796	1504	1336	1226	1108	1002
30	1857	1555	1381	1268	1146	1036

Table 5

Thermal power of heating bodies RESIDENCE 500/85 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 90 \text{ }^\circ\text{C}$

$t_{W2} = 70 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	418	379	356	341	326	309
3	587	532	500	479	458	433
4	756	686	644	617	590	558
5	925	839	788	755	722	683
6	1094	992	932	893	854	808
7	1263	1145	1077	1031	986	933
8	1431	1299	1221	1169	1118	1058
9	1600	1452	1365	1307	1250	1183
10	1769	1605	1509	1445	1382	1307
11	1938	1759	1653	1583	1514	1432
12	2107	1912	1797	1721	1646	1557
13	2276	2065	1941	1859	1778	1682
14	2445	2219	2085	1997	1911	1807
15	2614	2372	2229	2135	2043	1932
16	2783	2525	2373	2274	2175	2057
17	2952	2679	2518	2412	2307	2181
18	3121	2832	2662	2550	2439	2306
19	3290	2985	2806	2688	2571	2431
20	3459	3139	2950	2826	2703	2556
21	3628	3292	3094	2964	2835	2681
22	3797	3445	3238	3102	2967	2806
23	3966	3599	3382	3240	3099	2930
24	4135	3752	3526	3378	3231	3055
25	4304	3905	3670	3516	3363	3180
26	4473	4059	3814	3654	3495	3305
27	4642	4212	3959	3792	3627	3430
28	4811	4365	4103	3930	3759	3555
29	4980	4519	4247	4068	3891	3680
30	5149	4672	4391	4206	4023	3804

Table 6

Thermal power of heating bodies RESIDENCE 500/85 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 75\text{ °C}$

$t_{W2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	341	304	283	268	254	241
3	479	427	397	377	357	338
4	617	551	511	486	460	435
5	755	674	626	594	563	533
6	893	797	740	703	666	630
7	1031	920	855	812	769	728
8	1169	1043	969	920	872	825
9	1307	1166	1083	1029	975	922
10	1445	1289	1198	1138	1078	1020
11	1583	1412	1312	1246	1181	1117
12	1721	1536	1427	1355	1284	1215
13	1859	1659	1541	1464	1387	1312
14	1997	1782	1655	1572	1490	1409
15	2135	1905	1770	1681	1593	1507
16	2274	2028	1884	1790	1696	1604
17	2412	2151	1999	1898	1799	1701
18	2550	2274	2113	2007	1902	1799
19	2688	2398	2227	2116	2005	1896
20	2826	2521	2342	2224	2108	1994
21	2964	2644	2456	2333	2211	2091
22	3102	2767	2571	2442	2314	2188
23	3240	2890	2685	2550	2417	2286
24	3378	3013	2799	2659	2520	2383
25	3516	3136	2914	2767	2623	2481
26	3654	3259	3028	2876	2726	2578
27	3792	3383	3142	2985	2829	2675
28	3930	3506	3257	3093	2932	2773
29	4068	3629	3371	3202	3035	2870
30	4206	3752	3486	3311	3138	2968

Table 7

Thermal power of heating bodies RESIDENCE 500/85 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 55 \text{ }^\circ\text{C}$

$t_{W2} = 45 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	200	168	149	137	124	112
3	281	236	210	193	174	158
4	362	304	270	248	225	203
5	444	372	331	304	275	249
6	525	440	391	360	325	294
7	606	508	452	415	376	340
8	687	576	512	471	426	385
9	768	644	573	526	476	431
10	849	712	633	582	526	476
11	930	780	694	637	577	522
12	1011	848	754	693	627	567
13	1092	916	815	749	677	613
14	1173	985	875	804	727	658
15	1254	1053	936	860	778	704
16	1335	1121	996	915	828	749
17	1416	1189	1057	971	878	795
18	1497	1257	1117	1026	928	840
19	1578	1325	1178	1082	979	886
20	1659	1393	1238	1138	1029	931
21	1741	1461	1299	1193	1079	977
22	1822	1529	1359	1249	1130	1022
23	1903	1597	1420	1304	1180	1068
24	1984	1665	1480	1360	1230	1113
25	2065	1733	1541	1415	1280	1159
26	2146	1801	1601	1471	1331	1204
27	2227	1869	1662	1527	1381	1250
28	2308	1937	1722	1582	1431	1295
29	2389	2005	1782	1638	1481	1341
30	2470	2073	1843	1693	1532	1386

Table 8

Thermal power of heating bodies RESIDENCE 500/100 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 90\text{ }^{\circ}\text{C}$

$t_{W2} = 70\text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	423	384	361	346	331	314
3	594	540	508	486	466	441
4	765	695	654	627	600	567
5	937	851	800	767	734	694
6	1108	1006	946	907	868	821
7	1279	1162	1093	1047	1002	948
8	1450	1317	1239	1187	1136	1075
9	1621	1473	1385	1327	1270	1202
10	1793	1628	1531	1468	1404	1329
11	1964	1784	1678	1608	1539	1456
12	2135	1939	1824	1748	1673	1583
13	2306	2095	1970	1888	1807	1710
14	2477	2250	2116	2028	1941	1837
15	2648	2406	2263	2168	2075	1964
16	2820	2561	2409	2309	2209	2091
17	2991	2717	2555	2449	2343	2218
18	3162	2872	2701	2589	2477	2344
19	3333	3028	2848	2729	2612	2471
20	3504	3183	2994	2869	2746	2598
21	3676	3339	3140	3009	2880	2725
22	3847	3494	3286	3149	3014	2852
23	4018	3650	3433	3290	3148	2979
24	4189	3805	3579	3430	3282	3106
25	4360	3961	3725	3570	3416	3233
26	4532	4116	3871	3710	3550	3360
27	4703	4272	4018	3850	3685	3487
28	4874	4427	4164	3990	3819	3614
29	5045	4583	4310	4131	3953	3741
30	5216	4738	4456	4271	4087	3868

Table 9

Thermal power of heating bodies RESIDENCE 500/100 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 75\text{ °C}$

$t_{W2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	346	309	288	273	259	245
3	486	435	404	384	364	345
4	627	560	520	495	469	444
5	767	685	637	605	574	543
6	907	810	753	716	679	642
7	1047	935	870	827	784	742
8	1187	1061	986	937	889	841
9	1327	1186	1102	1048	994	940
10	1468	1311	1219	1158	1099	1040
11	1608	1436	1335	1269	1204	1139
12	1748	1561	1452	1380	1308	1238
13	1888	1686	1568	1490	1413	1337
14	2028	1812	1685	1601	1518	1437
15	2168	1937	1801	1712	1623	1536
16	2309	2062	1917	1822	1728	1635
17	2449	2187	2034	1933	1833	1735
18	2589	2312	2150	2043	1938	1834
19	2729	2438	2267	2154	2043	1933
20	2869	2563	2383	2265	2148	2032
21	3009	2688	2499	2375	2253	2132
22	3149	2813	2616	2486	2358	2231
23	3290	2938	2732	2597	2463	2330
24	3430	3064	2849	2707	2568	2430
25	3570	3189	2965	2818	2672	2529
26	3710	3314	3081	2928	2777	2628
27	3850	3439	3198	3039	2882	2727
28	3990	3564	3314	3150	2987	2827
29	4131	3690	3431	3260	3092	2926
30	4271	3815	3547	3371	3197	3025

Table 10

Thermal power of heating bodies RESIDENCE 500/100 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 55 \text{ }^\circ\text{C}$

$t_{W2} = 45 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	205	172	153	141	128	116
3	287	242	215	198	179	162
4	370	311	277	255	231	209
5	453	381	339	312	283	256
6	536	451	401	369	334	303
7	619	520	463	426	386	350
8	702	590	525	483	437	396
9	784	660	587	540	489	443
10	867	729	649	597	541	490
11	950	799	711	654	592	537
12	1033	869	773	711	644	584
13	1116	938	835	768	696	630
14	1198	1008	897	825	747	677
15	1281	1077	959	882	799	724
16	1364	1147	1021	939	851	771
17	1447	1217	1083	996	902	818
18	1530	1286	1145	1053	954	864
19	1613	1356	1207	1110	1005	911
20	1695	1426	1269	1167	1057	958
21	1778	1495	1331	1224	1109	1005
22	1861	1565	1393	1281	1160	1052
23	1944	1635	1455	1338	1212	1098
24	2027	1704	1517	1395	1264	1145
25	2109	1774	1579	1452	1315	1192
26	2192	1844	1641	1509	1367	1239
27	2275	1913	1703	1566	1419	1286
28	2358	1983	1765	1623	1470	1332
29	2441	2052	1827	1680	1522	1379
30	2524	2122	1889	1737	1573	1426

Table 11

Thermal power of heating bodies RESIDENCE 600/90 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 90 \text{ }^\circ\text{C}$

$t_{W2} = 70 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	492	445	418	400	382	361
3	691	626	587	562	537	507
4	890	806	756	724	691	653
5	1089	986	925	885	846	799
6	1289	1166	1094	1047	1000	945
7	1488	1346	1264	1209	1155	1091
8	1687	1527	1433	1371	1310	1237
9	1886	1707	1602	1533	1464	1383
10	2085	1887	1771	1694	1619	1529
11	2284	2067	1940	1856	1773	1675
12	2483	2248	2109	2018	1928	1821
13	2682	2428	2278	2180	2083	1967
14	2881	2608	2447	2342	2237	2113
15	3081	2788	2616	2504	2392	2259
16	3280	2968	2786	2665	2546	2405
17	3479	3149	2955	2827	2701	2551
18	3678	3329	3124	2989	2856	2697
19	3877	3509	3293	3151	3010	2843
20	4076	3689	3462	3313	3165	2989
21	4275	3870	3631	3474	3320	3135
22	4474	4050	3800	3636	3474	3281
23	4673	4230	3969	3798	3629	3427
24	4873	4410	4139	3960	3783	3573
25	5072	4590	4308	4122	3938	3719
26	5271	4771	4477	4284	4093	3865
27	5470	4951	4646	4445	4247	4011
28	5669	5131	4815	4607	4402	4157
29	5868	5311	4984	4769	4556	4303
30	6067	5491	5153	4931	4711	4449

Table 12

Thermal power of heating bodies RESIDENCE 600/90 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 75\text{ }^{\circ}\text{C}$

$t_{W2} = 65\text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	400	356	330	313	296	280
3	562	500	463	440	416	393
4	724	644	597	566	536	506
5	885	788	730	693	656	619
6	1047	931	864	819	776	732
7	1209	1075	997	946	895	846
8	1371	1219	1131	1073	1015	959
9	1533	1363	1264	1199	1135	1072
10	1694	1507	1398	1326	1255	1185
11	1856	1651	1531	1452	1375	1298
12	2018	1795	1665	1579	1495	1411
13	2180	1939	1798	1706	1615	1525
14	2342	2083	1932	1832	1734	1638
15	2504	2227	2065	1959	1854	1751
16	2665	2371	2199	2086	1974	1864
17	2827	2515	2332	2212	2094	1977
18	2989	2659	2465	2339	2214	2091
19	3151	2803	2599	2465	2334	2204
20	3313	2947	2732	2592	2453	2317
21	3474	3091	2866	2719	2573	2430
22	3636	3235	2999	2845	2693	2543
23	3798	3378	3133	2972	2813	2656
24	3960	3522	3266	3098	2933	2770
25	4122	3666	3400	3225	3053	2883
26	4284	3810	3533	3352	3173	2996
27	4445	3954	3667	3478	3292	3109
28	4607	4098	3800	3605	3412	3222
29	4769	4242	3934	3732	3532	3336
30	4931	4386	4067	3858	3652	3449

Table 13

Thermal power of heating bodies RESIDENCE 600/90 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 55\text{ °C}$

$t_{W2} = 45\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	232	194	172	157	142	128
3	326	272	241	221	199	180
4	419	350	311	285	257	232
5	513	429	380	348	314	284
6	607	507	449	412	372	336
7	701	585	519	476	429	388
8	794	664	588	539	487	439
9	888	742	658	603	544	491
10	982	820	727	667	602	543
11	1076	899	797	730	659	595
12	1170	977	866	794	717	647
13	1263	1056	936	858	774	699
14	1357	1134	1005	922	831	751
15	1451	1212	1075	985	889	803
16	1545	1291	1144	1049	946	855
17	1638	1369	1213	1113	1004	906
18	1732	1447	1283	1176	1061	958
19	1826	1526	1352	1240	1119	1010
20	1920	1604	1422	1304	1176	1062
21	2014	1682	1491	1367	1234	1114
22	2107	1761	1561	1431	1291	1166
23	2201	1839	1630	1495	1349	1218
24	2295	1917	1700	1558	1406	1270
25	2389	1996	1769	1622	1463	1321
26	2482	2074	1839	1686	1521	1373
27	2576	2153	1908	1749	1578	1425
28	2670	2231	1977	1813	1636	1477
29	2764	2309	2047	1877	1693	1529
30	2858	2388	2116	1940	1751	1581

BIMETAL RADIATORS

DUOSTAR

DUOSTAR

DESCRIPTION

Bimetal heating elements with a reduced water volume and extended face transfer surface forming a panel surface, connected into radiators by means of steel inserts with G 1" external right-hand & left-hand thread are manufactured in two types:

350/80 mm, 500/80 mm

The radiators correspond to EN 442 – 1 alteration A1. Radiators are made of siluminium AISi12Cu2 - special aluminium alloy and #20 Q195. This alloy is stable, homogeneous and nonporous plus chemically and electrically neutral towards other metals in the heating system.

The castings guarantee a long service life of products.

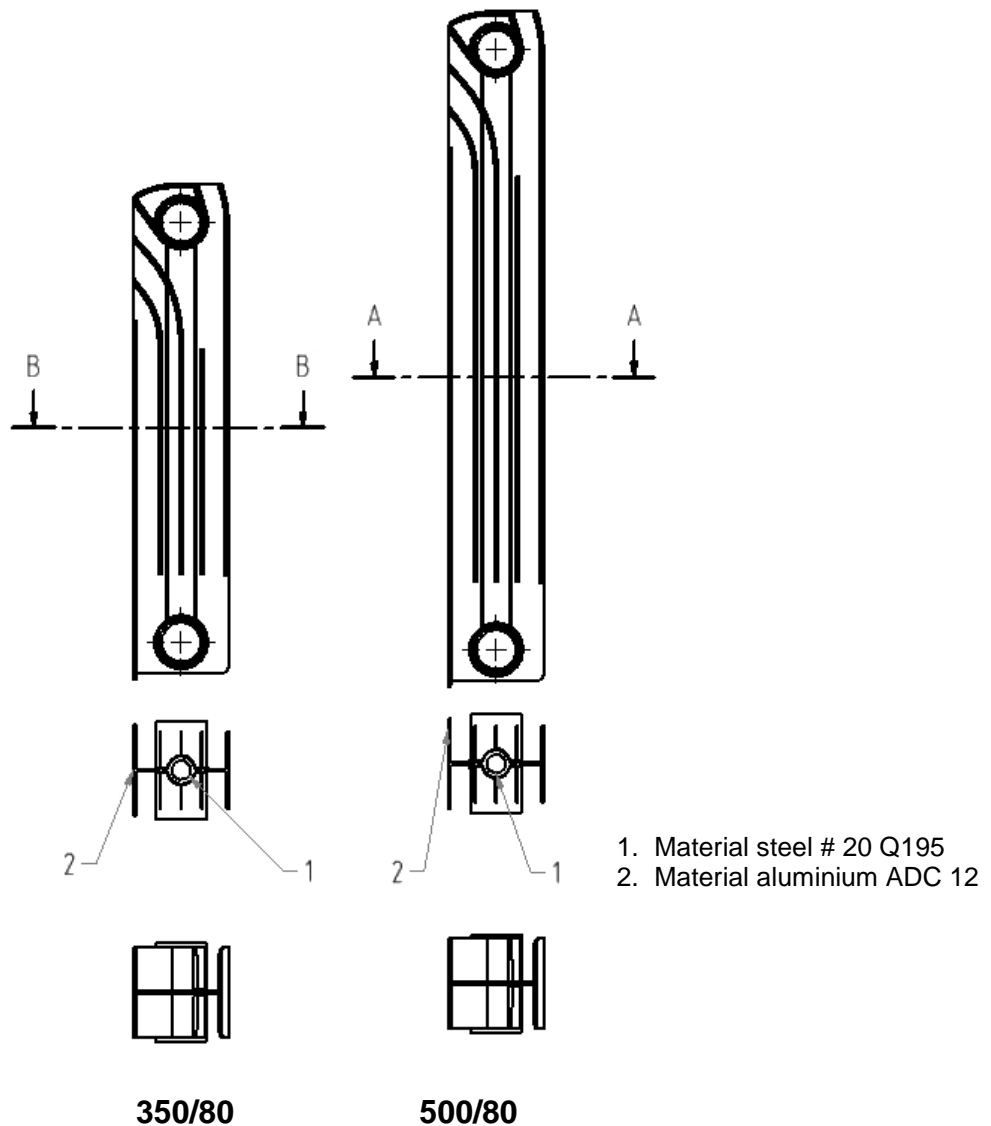


Fig. no. 1 DUOSTAR type heating elements

USAGE

All Residence type radiators are destined for hot water central heating systems both with gravity and forced heating water circulation with the maximum operating temperature lower than 110 °C and **maximum operating overpressure up to 3 MPa.**

THERMAL - TECHNICAL PARAMETERS

Environment: These radiators can be used in the environment from +2 °C to +35 °C.

Tab.no.1 The principal thermal – technical parameters of Duostar heating elements

Characteristic	Brand	Unit	350/80	500/80
Identification number			48	49
Total height	H	(mm)	431	563
spacing	h	(mm)	350	500
depth	B	(mm)	80	80
width	L	(mm)	82	82
connecting thread	G	"	1	1
weight	M	(kg/el.)	1,40	1,80
water volume	V	(dm ³ /el.)	0,27	0,38
heat output	Q _{Tn}	(W/el.)	94,4	123,5

All Duostar types are certified in SZÚ and thermal – technical parameters are experimentally tested according to ČSN EN 442-2.

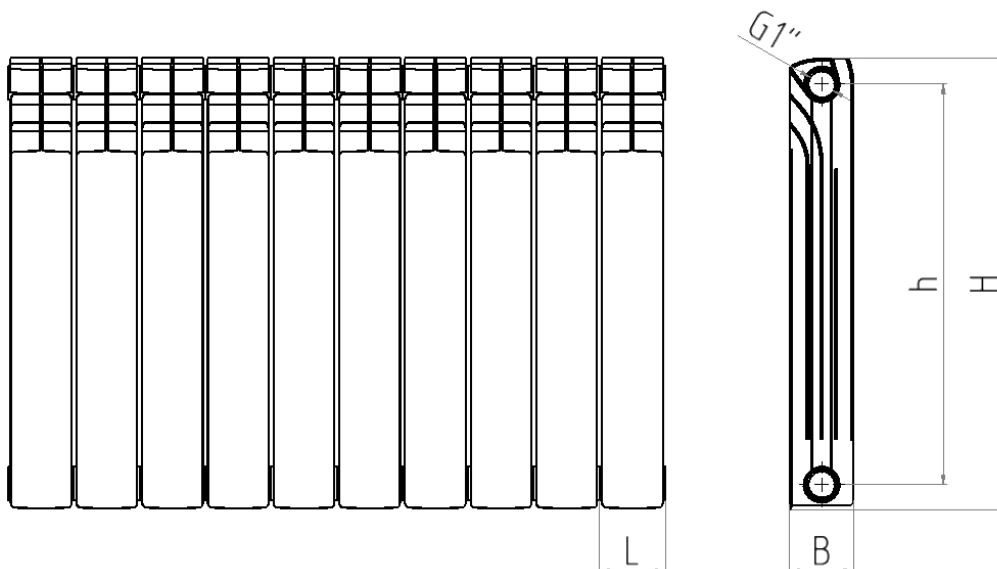


Fig. no. 2 Principal dimensions of Duostar elements

The principal thermal – technical parameters for water as the heat carrier with **90/70 °C temperature gradient** and single-sided connection (inlet) of water as the heat carrier at the top are shown in table no. 1. The individual types of radiators are measured without cover.

TEST OVERPRESSURE

At the manufacturer's the manufactured sets are exposed to the pressure test by applying 4,5 MPa cold water overpressure (for max. 3 MPa operating overpressure).

MOUNTING

When mounting individual radiators their position according to Fig. no.3 plus **minimum window-sill overlap** must be observed in order to achieve the maximum heat outputs.

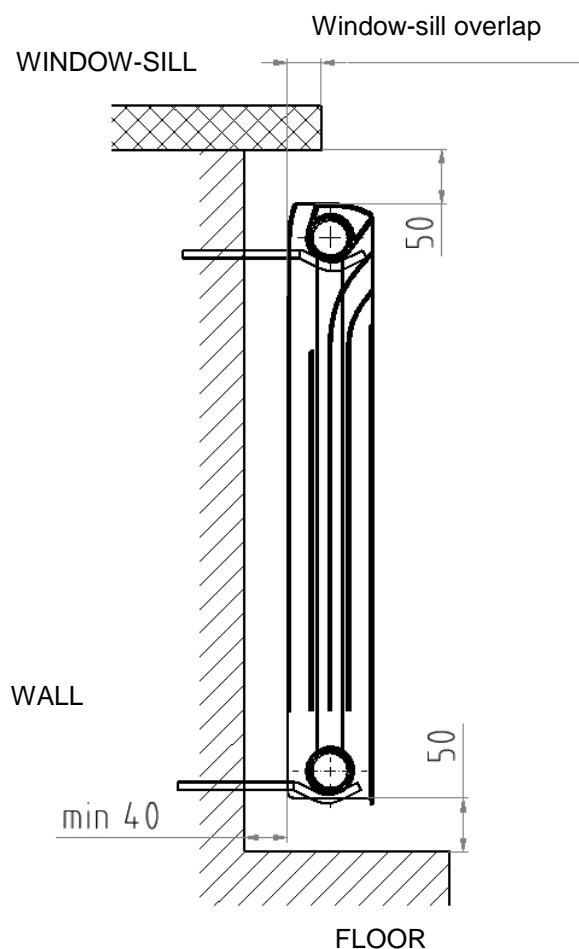


Fig. no. 3 Mounting of Duostar radiators

The rosettes with G1" external thread are used for Duostar radiators connection to the distribution pipe. When looking at the face panel surface the radiators are mounted from the left-hand side with the right-threaded rosette for heat carrier (water) connection and from the right-hand side with left-threaded rosette for G 1 heat carrier (water) outlet. The upper plug on the opposite side of heat carrier (water) connection can be equipped with drilling with eccentrically positioned G 1/2" thread for the bleed valve. It is suitable to use automatic bleed valves. Before connection (maximum number of 20 sections) of individual supplied sets into required size of radiators the bearing surfaces between elements and connection must be sealed with sealing material (Temasil) that by default is used in production and is suitable both for hot water and steam systems. The elements are tightened by means of steel inserts and applying min.180 Nm, max.250 Nm gyroscopic moment. The gyroscopic moment for rosettes tightening varies between 180 Nm and 250 Nm. Other data regarding the mounting instructions are stated in the common part of manual for all types of produced radiators

SUPPLEMENTARY DATA

The external surface of heating bodies shall be provided with a final paint prior to their putting into operation.

Thermal power changes if other heat-transfer fluid than the bodies were verified for (e.g. anti-free mixture) is used. Thus, utilization of such mixtures shall be consulted with the manufacturer of radiators.

Radiators thanks to their special chemical composition are suitable for a trouble-free combination with copper, iron and plastic systems. They work at pH between 7 and 9.5 and do not need inhibitors.

The class of reaction to fire A1.

SURFACE FINISHING

Finishing of Duostar radiators is done with a powder coating in RAL 9010

INSTALLATION INSTRUCTIONS

If the cast-iron heating bodies are used for central heating systems with forced circulation of heating water it is advisable to perform flushing of the system (preferably three times) prior to turning the pump on. This will ensure removal of all impurities, avoid clogging of ceramic plates of the pump and ensure long-term trouble-free operation.

PACKAGING, TRANSPORT, STORAGE

Ten-section radiators are delivered on a pallet in cardboard boxes. The sets shall be secured against shifting during transport properly. Customer shall store the products in such a way to protect them against climatic effects. The same principles apply to storage as applicable to transport.

Handling of sets should be done carefully to avoid their damage.

ORDERING

Purchase order shall include the following data:










- type of heating body
- connection spacing and depth
- supply number
- accessories according to the ordering code




Type	Dimension h / B **	Wattage (W/pc) 90/70/20°C	Ordering code
Duostar	350/80	94,4	16 058
Duostar	500/80	123,5	16 059

*) connecting thread 1"; delivery of 10-ti piece sets in the final surface finish in a cardboard container

***) h - spacing of the connecting holes, B - depth of the radiator

ACCESSORIES

Ordering code	Name	
Sets for Residence and Duostar radiators		
16 060	13-piece set 3/4" (it includes: 4x rosette, 3x bracket, 3x dowel, 1x bleeder valve, 1x small key, 1x plug)	
16 061	13-piece set 1/2" (it includes: 4x rosette, 3x bracket, 3x dowel, 1x bleeder valve, 1x small key, 1x plug)	
16 062	11-piece set 3/4" (it includes: 4x rosette, 2x bracket, 2x dowel, 1x bleeder valve, 1x small key, 1x plug)	
16 063	11-piece set 1/2" (it includes: 4x rosette, 2x bracket, 2x dowel, 1x bleeder valve, 1x small key, 1x plug)	
Rosette 1"		
16 064	Rosette 1" x 1/2" left	
16 065	Rosette 1" x 1/2" right	
16 066	Rosette 1" x 3/4" left	
16 067	Rosette 1" x 3/4" right	
16 068	Rosette 1" full left	
16 069	Rosette 1" full right	
Nipples		
16 070	radiator nipple 1"	
Plugs		
16 072	Plug 3/4"	
16 073	Plug 1/2"	
Bleeder valves		
16 071	Bleeder valve 1/2"	
Brackets		
16 074	Fixation bracket big (set of 2 pc brackets)	
16 075	Fixation bracket small (set of 2 pc brackets)	
16226	Bracket with a dowel	

Ordering code	Name	
Keys		
16 227	Tightening key for rosettes (plastic)	
16 228	Pull-off key	
Sealing		
16 229	Sealing 1"	

Note: 1 upper bracket and 2 lower brackets are fastened for the 10-cell battery.

Number of consoles depends on the size of cells

Dimensions of sections (mm)	Number of elements														
	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Duostar 350/80			3				3			3		3	3	6	6
Duostar 500/80			3				3			3		3	3	6	6

DELIVERY TIME

- **14 days**

The delivery time begins on receipt of the binding order. In case the ordered goods aren't in stock the seller informs the buyer and at same time he will inform him about the preliminary delivery date.

WARRANTY

Manufacturer provides 10 years warranty covering production defects on heating systems delivered. The warranty period starts as of the ex-works shipment date from Viadrus division.

THERMAL POWER TABLES FOR INDIVIDUAL MODELS OF HEATING BODIES

WARM-WATER HEATING

Temperature gradient to EN 442 – 2

Temperature gradients 90/70 °C
 75/65 °C
 55/45 °C

Table 2

Thermal power of heating bodies DUOSTAR 350/80 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 90\text{ }^{\circ}\text{C}$

$t_{W2} = 70\text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	277	251	236	226	216	204
3	389	353	331	317	303	286
4	501	454	426	408	390	369
5	613	556	522	500	478	452
6	725	657	617	591	565	534
7	837	759	713	682	652	617
8	949	860	808	774	740	699
9	1061	962	903	865	827	782
10	1173	1063	999	956	914	864
11	1285	1165	1094	1048	1002	947
12	1397	1266	1190	1139	1089	1029
13	1509	1368	1285	1230	1176	1112
14	1621	1470	1380	1322	1264	1194
15	1733	1571	1476	1413	1351	1277
16	1845	1673	1571	1504	1438	1359
17	1957	1774	1667	1596	1526	1442
18	2069	1876	1762	1687	1613	1524
19	2181	1977	1857	1778	1700	1607
20	2293	2079	1953	1870	1787	1689
21	2405	2180	2048	1961	1875	1772
22	2518	2282	2143	2052	1962	1855
23	2630	2384	2239	2144	2049	1937
24	2742	2485	2334	2235	2137	2020
25	2854	2587	2430	2326	2224	2102
26	2966	2688	2525	2418	2311	2185
27	3078	2790	2620	2509	2399	2267
28	3190	2891	2716	2600	2486	2350
29	3302	2993	2811	2692	2573	2432
30	3414	3094	2907	2783	2661	2515

Table 3

Thermal power of heating bodies DUOSTAR 350/80 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 75\text{ °C}$

$t_{W2} = 65\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	226	201	187	177	168	159
3	317	282	262	249	236	223
4	408	364	338	321	304	287
5	500	445	413	392	372	351
6	591	527	489	464	440	416
7	682	608	564	536	508	480
8	774	689	640	608	576	544
9	865	771	716	679	644	608
10	956	852	791	751	711	672
11	1048	934	867	823	779	737
12	1139	1015	942	894	847	801
13	1230	1096	1018	966	915	865
14	1322	1178	1093	1038	983	929
15	1413	1259	1169	1110	1051	994
16	1504	1340	1244	1181	1119	1058
17	1596	1422	1320	1253	1187	1122
18	1687	1503	1395	1325	1255	1186
19	1778	1585	1471	1397	1323	1250
20	1870	1666	1547	1468	1391	1315
21	1961	1747	1622	1540	1459	1379
22	2052	1829	1698	1612	1527	1443
23	2144	1910	1773	1683	1595	1507
24	2235	1991	1849	1755	1663	1571
25	2326	2073	1924	1827	1731	1636
26	2418	2154	2000	1899	1799	1700
27	2509	2236	2075	1970	1867	1764
28	2600	2317	2151	2042	1934	1828
29	2692	2398	2227	2114	2002	1893
30	2783	2480	2302	2185	2070	1957

Table 4

Thermal power of heating bodies DUOSTAR 350/80 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 55\text{ °C}$

$t_{W2} = 45\text{ °C}$

Thermal power Q (W) at air temperature of t_i (°C)

No of sections (n)	10	15	18	20	22	24
2	132	110	98	90	81	74
3	185	155	138	126	114	103
4	239	200	177	163	147	133
5	292	245	217	199	180	163
6	345	289	257	236	213	193
7	399	334	297	272	246	222
8	452	379	336	309	279	252
9	505	423	376	345	312	282
10	559	468	416	382	345	312
11	612	513	455	418	378	342
12	665	557	495	454	411	371
13	719	602	535	491	444	401
14	772	647	574	527	477	431
15	826	692	614	564	509	461
16	879	736	654	600	542	491
17	932	781	694	637	575	520
18	986	826	733	673	608	550
19	1039	870	773	710	641	580
20	1092	915	813	746	674	610
21	1146	960	852	782	707	639
22	1199	1005	892	819	740	669
23	1252	1049	932	855	773	699
24	1306	1094	971	892	806	729
25	1359	1139	1011	928	839	759
26	1412	1183	1051	965	872	788
27	1466	1228	1090	1001	905	818
28	1519	1273	1130	1038	938	848
29	1573	1317	1170	1074	971	878
30	1626	1362	1210	1110	1003	907

Table 5

Thermal power of heating bodies DUOSTAR 500/80 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 90\text{ }^{\circ}\text{C}$

$t_{W2} = 70\text{ }^{\circ}\text{C}$

Thermal power Q (W) at air temperature of t_i ($^{\circ}\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	362	328	308	295	282	267
3	509	461	433	415	396	375
4	656	594	558	534	511	482
5	803	727	683	654	625	590
6	949	860	808	773	739	698
7	1096	993	932	893	853	806
8	1243	1126	1057	1012	967	914
9	1389	1259	1182	1131	1082	1022
10	1536	1392	1307	1251	1196	1130
11	1683	1525	1432	1370	1310	1238
12	1829	1657	1556	1490	1424	1346
13	1976	1790	1681	1609	1538	1454
14	2123	1923	1806	1729	1653	1562
15	2269	2056	1931	1848	1767	1669
16	2416	2189	2056	1968	1881	1777
17	2563	2322	2180	2087	1995	1885
18	2709	2455	2305	2207	2109	1993
19	2856	2588	2430	2326	2224	2101
20	3003	2721	2555	2446	2338	2209
21	3149	2854	2680	2565	2452	2317
22	3296	2986	2804	2685	2566	2425
23	3443	3119	2929	2804	2680	2533
24	3589	3252	3054	2923	2794	2641
25	3736	3385	3179	3043	2909	2749
26	3883	3518	3304	3162	3023	2856
27	4029	3651	3428	3282	3137	2964
28	4176	3784	3553	3401	3251	3072
29	4323	3917	3678	3521	3365	3180
30	4470	4050	3803	3640	3480	3288

Table 6

Thermal power of heating bodies DUOSTAR 500/80 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 75 \text{ }^\circ\text{C}$

$t_{W2} = 65 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	295	263	244	232	219	207
3	415	369	343	325	308	291
4	534	476	441	419	397	375
5	654	582	540	513	486	459
6	773	689	639	606	574	543
7	893	795	738	700	663	627
8	1012	901	836	794	752	711
9	1131	1008	935	888	841	794
10	1251	1114	1034	981	929	878
11	1370	1221	1133	1075	1018	962
12	1490	1327	1231	1169	1107	1046
13	1609	1433	1330	1263	1196	1130
14	1729	1540	1429	1356	1284	1214
15	1848	1646	1528	1450	1373	1298
16	1968	1753	1626	1544	1462	1381
17	2087	1859	1725	1637	1551	1465
18	2207	1965	1824	1731	1640	1549
19	2326	2072	1923	1825	1728	1633
20	2446	2178	2021	1919	1817	1717
21	2565	2285	2120	2012	1906	1801
22	2685	2391	2219	2106	1995	1885
23	2804	2497	2318	2200	2083	1969
24	2923	2604	2416	2293	2172	2052
25	3043	2710	2515	2387	2261	2136
26	3162	2817	2614	2481	2350	2220
27	3282	2923	2713	2575	2438	2304
28	3401	3029	2811	2668	2527	2388
29	3521	3136	2910	2762	2616	2472
30	3640	3242	3009	2856	2705	2556

Table 7

Thermal power of heating bodies DUOSTAR 500/80 depending on required air temperature and number of sections

Warm-water heating

$t_{W1} = 55 \text{ }^\circ\text{C}$

$t_{W2} = 45 \text{ }^\circ\text{C}$

Thermal power Q (W) at air temperature of t_i ($^\circ\text{C}$)

No of sections (n)	10	15	18	20	22	24
2	172	144	128	117	106	96
3	242	202	180	165	149	135
4	311	261	231	212	192	173
5	381	319	283	260	235	212
6	451	377	335	307	278	251
7	520	436	387	355	320	290
8	590	494	438	402	363	328
9	660	552	490	450	406	367
10	729	610	542	497	449	406
11	799	669	593	545	492	445
12	868	727	645	592	535	483
13	938	785	697	640	578	522
14	1008	844	749	687	621	561
15	1077	902	800	735	663	600
16	1147	960	852	782	706	639
17	1217	1018	904	829	749	677
18	1286	1077	956	877	792	716
19	1356	1135	1007	924	835	755
20	1425	1193	1059	972	878	794
21	1495	1252	1111	1019	921	832
22	1565	1310	1163	1067	964	871
23	1634	1368	1214	1114	1007	910
24	1704	1426	1266	1162	1049	949
25	1774	1485	1318	1209	1092	987
26	1843	1543	1370	1257	1135	1026
27	1913	1601	1421	1304	1178	1065
28	1983	1660	1473	1352	1221	1104
29	2052	1718	1525	1399	1264	1142
30	2122	1776	1576	1447	1307	1181

DESIGNING DATA

DESIGNING DATA

The main thermal and technical parameters for all types of heating bodies are indicated in tables. The following formulae apply to conversion of thermal power of a heating body from basic operating mode for other warm-water difference than stated in previous text.

Calculation of the heat output according to the equation (1)

$$Q_T = Q_{Tn} \cdot \varphi_{\Delta t}$$

Calculation of the temperature difference according to the equation (2 and 3)

Hot-water heating according to the equation (2)

$$\Delta t = \frac{t_{w1} + t_{w2}}{2} - t_i \quad \text{for warm-water heating}$$

Steam heating according to the equation (3)

$$\Delta t = t_{pk} - t_i \quad \text{for steam heating}$$

The calculation of the correction factor for the temperature difference according to the equation (4)

$$\varphi_{\Delta t} = \left(\frac{\Delta t}{\Delta t_n} \right)^n$$

n	(-)	.....	temperature exponent
Q_T	(W)	.....	radiator heat output under operating conditions
Q_{Tn}	(W)	.....	nominal heat output (in the base operating condition)
t_i	(°C)	.....	air temperature
t_{pk}	(°C)	.....	condensing temperature of steam
t_{w1}	(°C)	.....	inlet water temperature
t_{w2}	(°C)	.....	outlet water temperature
Δ t	(°C)	.....	temperature difference for the new - the calculation conditions
Δ t_n	(°C)	.....	temperature difference in the base operating condition (temperature gradient 75/65 °C, air temperature 20 °C → Δ t _n = 50)
φ_{Δt}	(°C)	.....	correction factor for temperature difference

Detailed information on conversion of the heating body's thermal power for other operating conditions are provided in the Czech standard CSN 06 1101 or other appropriate standards applicable in individual countries.

PRESSURE LOSSES

Pressure losses of all type of heating bodies manufactured were verified experimentally. Data provided in Table 76 apply to particular calculations of pressure losses at the water flow. These data can be used independently on the number of cells in the system for two-point connection to the distribution piping.

Table 1 Factors for calculation of pressure losses

Pipe connection size	ξ_T (-)	A_T (m ²)
DN 6 (1/8")	1.0	0.00008
DN 8 (1/4")	1.0	0.00010
DN 10 (3/8")	1.0	0.00013
DN 15 (1/2")	2.5	0.00018
DN 20 (3/4")	2.5	0.00030
DN 25 (1")	2.5	0.00046
DN 32 (5/4")	2.5	0.00091

Formula for calculation of pressure losses Δp (Pa) is as follows:

$$\Delta p = \xi_T \cdot \frac{w^2}{2} \cdot \rho_w = \frac{(V)^2}{(A_T)^2} \cdot \rho_w$$

- ξ_T (-) drag coefficient
- A_T (m²) flow coefficient
- w (m.sec⁻¹) water velocity in pipeline
- V (m³.sec⁻¹) volume flow of water
- ρ_w (kg.m⁻³) water density

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