Duck Strip 4.1

Radiant panels

TECHNICAL LEAFLET

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Radiant panels

The new **Sabiana Duck Strip 4.1** radiant panel represents the maximum evolution of hot water radiant ceiling heating systems.

Built in compliance with the European Standard EN 14037 at the Sabiana facilities in Corbetta (MI), **it is manufactured according to the National Industry 4.0 Plan**, with industrial automation that integrates some new production technologies that improve working conditions and increase the productivity and functional quality of the plants; all this with an eye on energy consumption, creating more efficient systems and reducing any waste of energy according to the typical paradigms of Sustainable energy.

Since 1971 Sabiana, world leader in the heating and air conditioning industry, has been designing, manufacturing and selling high temperature or hot water radiant panels installed in all types of environments (small, medium and large industry, sport, commercial, recreational and zootechnical facilities, etc.) and designed to ensure the **maximum possible comfort** combined with **high energy consumption savings**.

The high construction standards and the use of high quality raw materials guarantee a product designed to last over the years, without any functional problems and with unchanged thermal efficiency.
These characteristics have led Sabiana Duck Strip radiant panels to being chosen by the most important companies worldwide, those that consider each cost item as a **production investment.**

Sabiana has significantly expanded the range of radiant panel models available with the **introduction of two new versions**; the first one featuring 18 mm diameter pipes (with variable pitches of 75 mm or 100 mm) and the second one featuring 28 mm pipes (with 150 mm pitch), for a total of 18 different types.

Series DS-ST18

- **Radiant panel made of** 0.8 mm thick high quality **steel**.
- 18 mm diameter electro-welded steel **pipes** with smooth ends for joining with pressfittings.
- **Pipe/Plate connection** made by spot welding.
- **Pipe pitch** 100 mm (DS-ST18-3) or 75 mm (DS-ST18-4).
- Square section **headers** welded at the factory on the first and final sections.
- Possibility of **raised header**.
- **Angle brackets**.
- **Sheet metal retaining clips** for fastening the fibreglass insulation.
- Shaped and painted **make-up joints** for covering the junction area.
- **Protection** with a special phosphodegreasing process and epoxy-polyester powder coating, dried in a furnace at 180°C – RAL 9016 (white) or RAL 9002 (light grey), in compliance with Directive 76/769/EEC. Other RAL colours available on request.
- **Fibreglass insulation** available (supplied in bulk rolls) with 30 mm standard thickness, or 40 mm on request:
- **Emission** of the radiant surface ε = 0,96.

Serie DS-ST28

- **Radiant panel** made of 1.2 mm thick high quality **steel**.
- 28 mm diameter electro-welded steel **pipes** with smooth ends for joining with pressfittings.
- **Pipe/Plate connection** made by spot welding.
- **Version with special pipe** for high temperature hot water systems (DS-SP).
- **Pipe pitch** 150 mm.
- Square section **headers** welded at the factory on the first and final sections.
- Possibility of **raised header**.
- **Angle brackets**.
- **Sheet metal retaining clips** for fastening the fibreglass insulation.
- Shaped and painted **make-up joints** for covering the junction area.
- **Protection** with a special phosphodegreasing process and epoxy-polyester powder coating, dried in a furnace at 180°C – RAL 9016 (white) or RAL 9002 (light grey), in compliance with Directive 76/769/EEC. Other RAL colours available on request.
- **Fibreglass insulation** available (supplied in bulk rolls) with 30 mm standard thickness, or 40 mm on request:
- **Emission** of the radiant surface ε = 0,96.

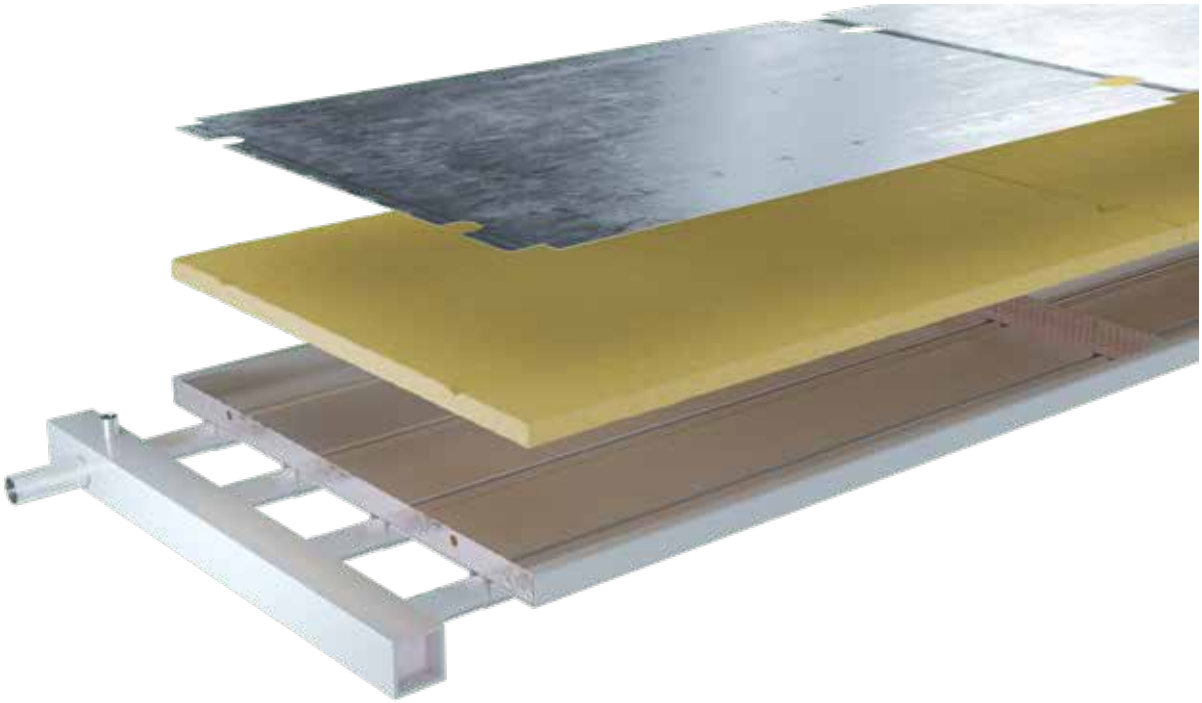
FIBREGLASS INSULATION

Fibreglass insulation available (supplied in bulk rolls) with 30 mm standard thickness, with 25 micron aluminium sheet support.

Reaction to fire class
Class: A1 according to Standard EN 13501-1.

Technical characteristics
The totally inorganic nature of the fibreglass ensures a long lasting thermal efficiency, prevention from parasites and rodents, no hygroscopicity and makes be rotproof.

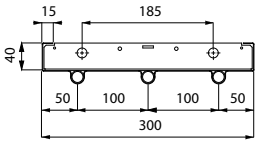
Thickness	30 mm	40 mm
Thermal conductivity in compliance with EN14303	0,036 W/mK	0,034 W/mK
Density	20 kg/m^3	25 kg/m^3
Thermal resistance	0,83 m^{2}K/W	1,17 m^{2}K/W



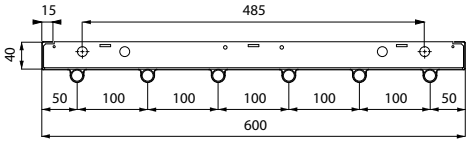
DS-ST18 range

Pipes 18 mm Ø, **100** mm pitch

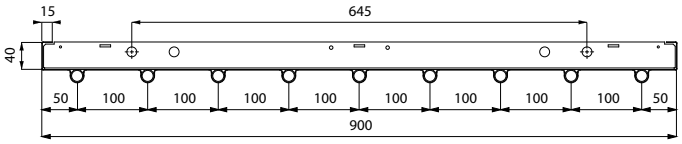
DS-ST18-3-030; 3 PIPES



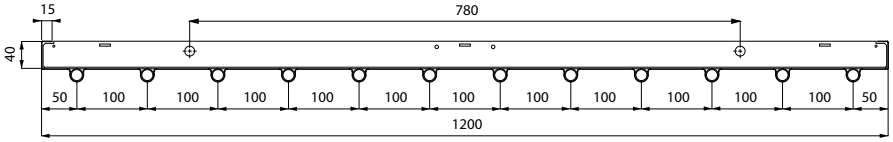
DS-ST18-3-060; 6 PIPES



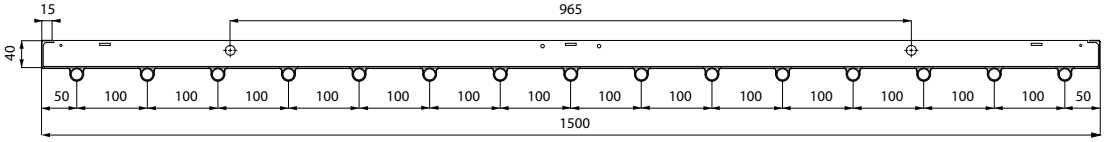
DS-ST18-3-090; 9 PIPES



DS-ST18-3-120; 12 PIPES

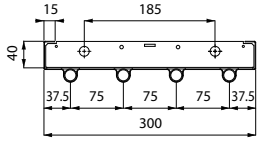


DS-ST18-3-150; 15 PIPES

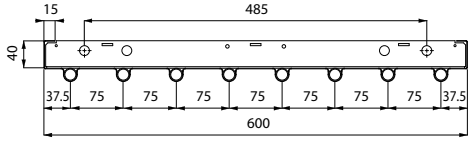


Pipes 18 mm Ø, **75** mm pitch

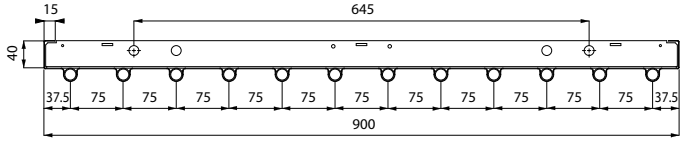
DS-ST18-4-030; 4 PIPES



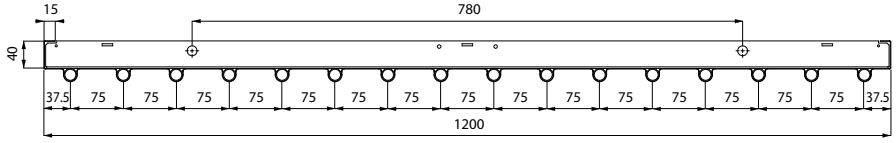
DS-ST18-4-060; 8 PIPES



DS-ST18-4-090; 12 PIPES



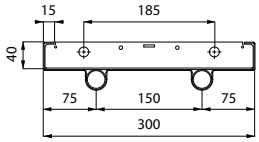
DS-ST18-4-120; 16 PIPES



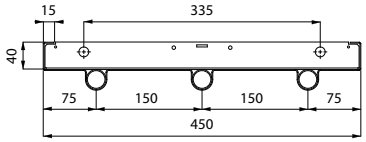
DS-ST28 range

Pipes 28 mm Ø, **150** mm pitch

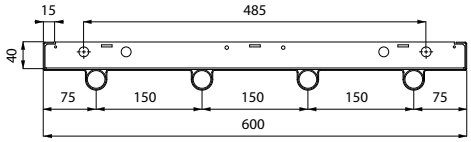
DS-ST28-2-030; 2 PIPES



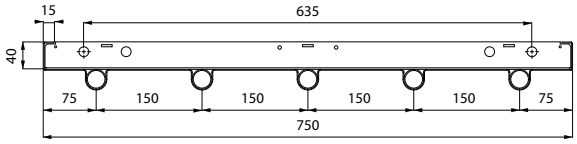
DS-ST28-2-045; 3 PIPES



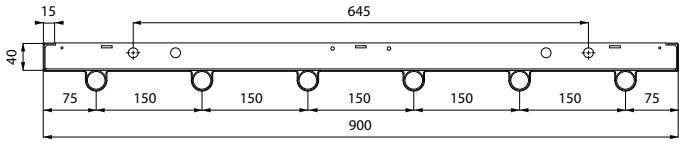
DS-ST28-2-060; 4 PIPES



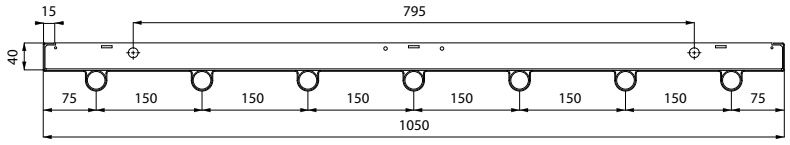
DS-ST28-2-075; 5 PIPES



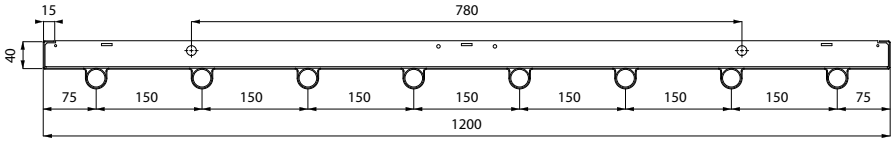
DS-ST28-2-090; 6 PIPES



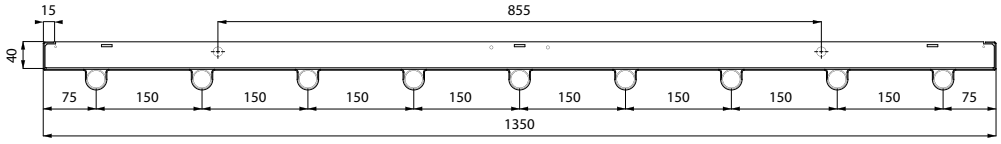
DS-ST28-2-105; 7 PIPES



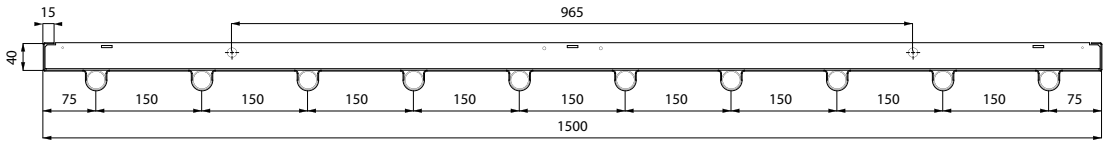
DS-ST28-2-120; 8 PIPES



DS-ST28-2-135; 9 PIPES

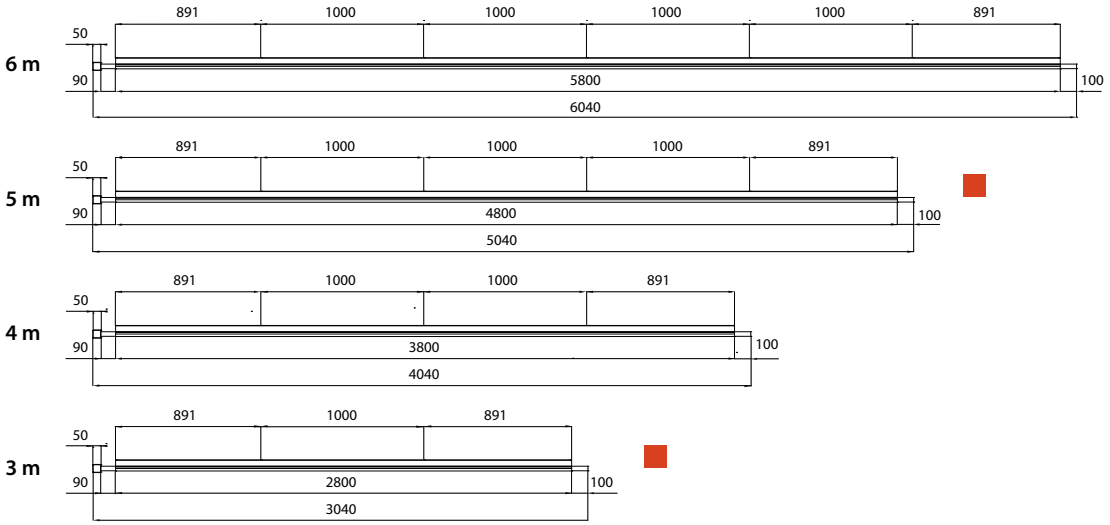


DS-ST28-2-150; 10 PIPES

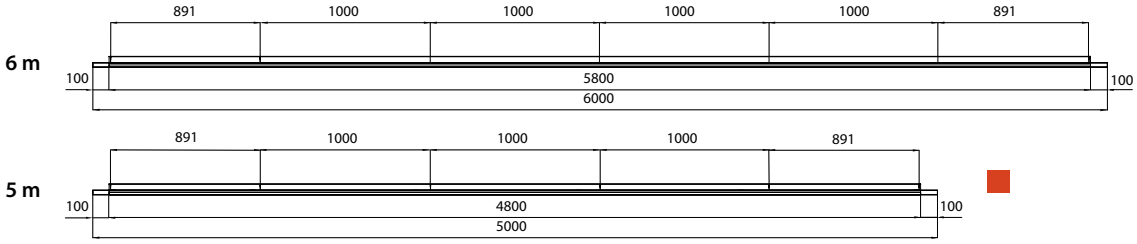


Modular lengths and hanging bracket pitches

Start and final head



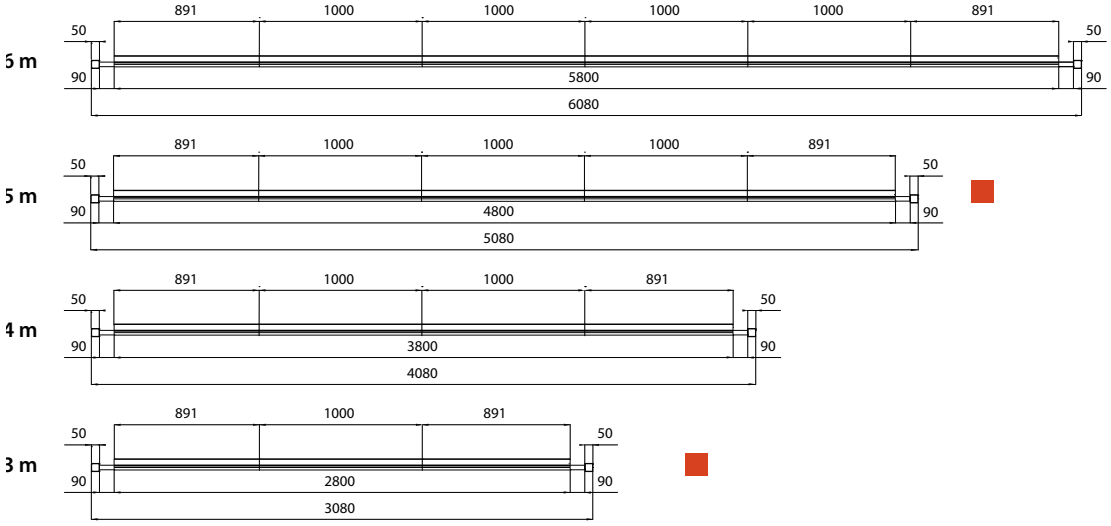
Intermediate



Special version on request

Modular lengths and hanging bracket pitches

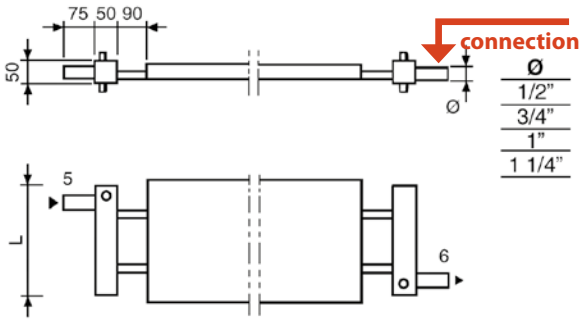
Double heads



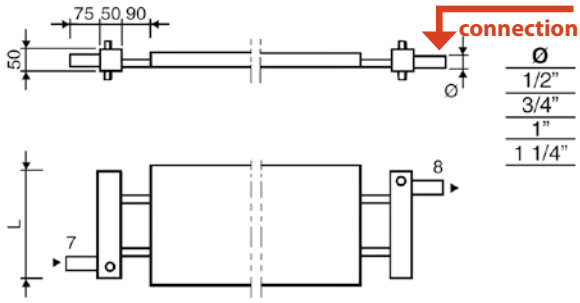
Special version on request

B Model

5-6 connections

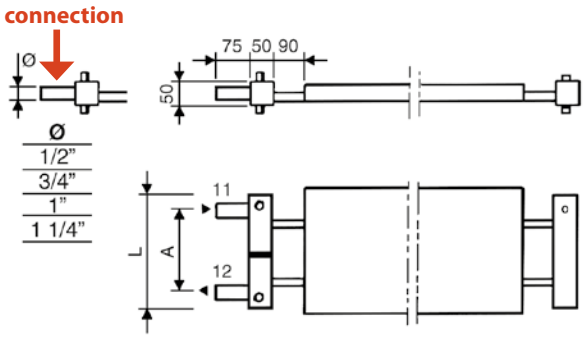


7-8 connections

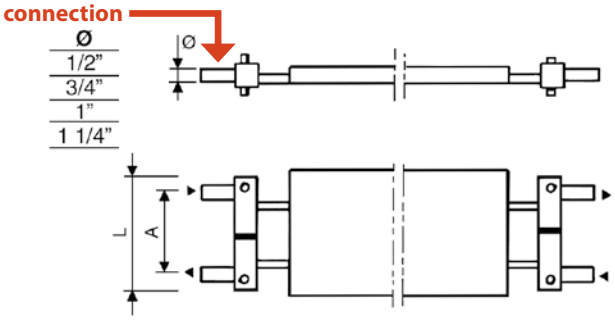


Model	030	045	060	075	090	105	120	135	150
L	300	450	600	750	900	1050	1200	1350	1500

D Model



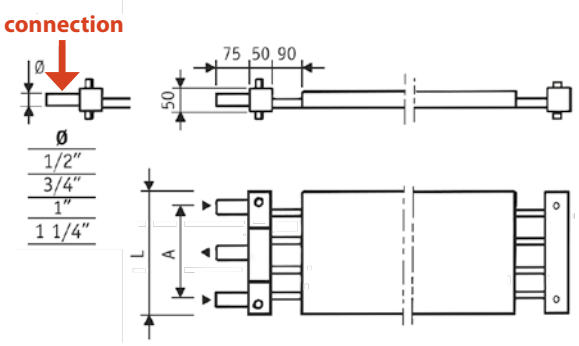
D+D Model



Model	030	045	060	075	090	105	120	135	150
L	300	450	600	750	900	1050	1200	1350	1500
A	200	350	500	650	800	950	1100	1250	1400

D and D+D headers are not suitable for high temperature hot water.
"D" header can be used with hot water up to lines with a maximum length of 50 and using slow and soft opening valves.

G Model



Model	120	135	150
L	1200	1350	1500
A	1100	1250	1400

NOMINAL WATER WEIGHTS AND CONTENTS

Model		Radiant panel				Header		
		Weight kg/m		Water content l/m		Weight kg		Water content l
standard	special	standard	special	standard	special	empty	with water	
DS-ST18-3-030	-	4	-	0,57	-	1,00	1,64	0,64
DS-ST18-3-060	-	8	-	1,15	-	2,00	3,33	1,33
DS-ST18-3-090	-	12	-	1,72	-	2,90	4,92	2,02
DS-ST18-3-120	-	16	-	2,29	-	3,80	6,51	2,71
DS-ST18-3-150	-	19	-	2,87	-	4,70	8,10	3,40
DS-ST18-4-030	-	5	-	0,77	-	1,00	1,64	0,64
DS-ST18-4-060	-	9	-	1,53	-	2,00	3,33	1,33
DS-ST18-4-090	-	14	-	2,29	-	2,90	4,92	2,02
DS-ST18-4-120	-	18	-	3,06	-	3,80	6,51	2,71
DS-ST28-2-030	**DS-SP28-2-030**	6	6,60	0,98	0,91	1,0	1,64	0,64
DS-ST28-2-045	**DS-SP28-2-045**	9	9,90	1,47	1,36	1,5	2,49	0,99
DS-ST28-2-060	**DS-SP28-2-060**	11	12,20	1,96	1,81	2,0	3,33	1,33
DS-ST28-2-075	**DS-SP28-2-075**	14	15,50	2,45	2,26	2,4	4,08	1,68
DS-ST28-2-090	**DS-SP28-2-090**	16	17,80	2,95	2,71	2,9	4,92	2,02
DS-ST28-2-105	**DS-SP28-2-105**	19	21,10	3,44	3,17	3,3	5,67	2,37
DS-ST28-2-120	**DS-SP28-2-120**	22	24,40	3,93	3,62	3,8	6,51	2,71
DS-ST28-2-135	**DS-SP28-2-135**	24	26,70	4,42	4,07	4,3	7,36	3,06
DS-ST28-2-150	**DS-SP28-2-150**	27	30,00	4,91	4,52	4,7	8,10	3,40

Duck Strip 4.1 | THERMAL EMISSIONS OF DS-ST18 RADIANT PANELS

Thermal emissions for each meter according to European Standard EN 14037-3

	18-3-030	18-3-060	18-3-090	18-3-120	18-3-150	18-4-030	18-4-060	18-4-090	18-4-120
K	1,933	3,247	4,448	5,731	7,173	2,075	3,354	4,569	5,852
n	1,159	1,157	1,173	1,169	1,164	1,161	1,175	1,182	1,182
Δtm (K)	W/m	W/m	W/m	W/m	W/m	W/m	W/m	W/m	W/m
20	62	104	149	190	234	67	113	158	202
22	70	116	167	213	262	75	127	176	226
24	77	128	185	235	290	83	140	196	250
26	84	141	203	258	318	91	154	215	275
28	92	153	222	282	347	99	168	235	301
30	100	166	240	305	376	108	182	255	326
32	107	179	259	329	405	116	197	275	352
34	115	192	278	354	435	124	211	295	378
36	123	205	298	378	465	133	226	316	404
38	131	218	317	403	495	142	241	337	431
40	139	232	337	428	525	150	256	358	458
42	147	245	357	453	556	159	271	379	485
44	155	259	377	478	587	168	286	400	513
46	163	272	397	503	618	177	302	422	540
48	172	286	417	529	650	186	317	444	568
50	180	300	438	555	681	195	333	466	596
52	188	314	458	581	713	204	348	488	625
54	197	328	479	607	745	213	364	510	653
55	201	335	489	620	761	218	372	521	667
56	205	342	500	634	777	222	380	532	682
58	214	356	521	660	810	231	396	555	711
60	222	371	542	687	842	241	412	578	740
62	231	385	563	714	875	250	428	600	769
64	240	399	585	741	908	259	444	623	798
65	244	406	595	754	925	264	453	635	813
66	248	414	606	768	941	269	461	646	828
68	257	428	628	795	974	278	477	670	858
70	266	443	649	823	1008	288	494	693	888
72	275	458	671	850	1041	297	510	716	918
74	284	472	693	878	1075	307	527	740	948
76	292	487	715	906	1109	317	544	764	978
78	301	502	737	933	1143	326	561	788	1009
80	310	517	759	961	1177	336	578	811	1039
82	319	532	782	990	1212	346	595	836	1070
84	328	547	804	1018	1246	356	612	860	1101
86	338	562	827	1046	1281	366	629	884	1132
88	347	577	849	1075	1315	375	646	908	1163
90	356	592	872	1103	1350	385	663	933	1195
92	365	608	895	1132	1385	395	681	957	1226
94	374	623	918	1161	1420	405	698	982	1258
96	383	638	941	1190	1456	415	716	1007	1289
98	393	654	964	1219	1491	425	733	1031	1321
100	402	669	987	1248	1527	436	751	1056	1353

Δtm (K) = difference between the mean water temperature and the room temperature

K = coefficient related to the heating body

n = = exponent related to the heating body

The thermal emissions are calculated according to the following fomula: $Q = K (\Delta tm)^n$

The tests have been carried out by Kermi GmbH laboratory in Plattling, Germany

THERMAL EMISSIONS OF DS-ST18 PRESSFITTINGS

Thermal emissions for a couple of headers according to European Standard EN 14037-3

	18-3-030	18-3-060	18-3-090	18-3-120	18-3-150	18-4-030	18-4-060	18-4-090	18-4-120
K	0,393	0,779	1,177	1,582	1,962	0,435	0,861	1,305	1,757
n	1,216	1,216	1,216	1,216	1,216	1,235	1,235	1,235	1,235
Δtm (K)	W	W	W	W	W	W	W	W	W
20	30	60	90	121	150	35	70	106	142
22	34	67	101	136	168	40	78	119	160
24	37	74	112	151	187	44	87	132	178
26	41	82	124	166	206	49	96	146	196
28	45	90	135	182	226	53	106	160	215
30	49	97	147	198	245	58	115	174	234
32	53	105	159	214	265	63	124	189	254
34	57	113	171	230	286	68	134	203	274
36	61	122	184	247	306	73	144	218	294
38	66	130	196	264	327	78	154	233	314
40	70	138	209	281	348	83	164	248	334
42	74	147	222	298	369	88	174	264	355
44	78	155	235	315	391	93	184	279	376
46	83	164	248	333	413	98	195	295	397
48	87	173	261	350	435	104	205	311	419
50	91	181	274	368	457	109	216	327	441
52	96	190	287	386	479	114	227	343	462
54	100	199	301	404	502	120	237	360	485
55	103	204	308	414	513	123	243	368	496
56	105	208	314	423	524	125	248	376	507
58	110	217	328	441	547	131	259	393	529
60	114	226	342	460	570	137	270	410	552
62	119	236	356	478	593	142	282	427	575
64	124	245	370	497	617	148	293	444	598
65	126	249	377	507	628	151	299	452	609
66	128	254	384	516	640	154	304	461	621
68	133	264	398	535	664	159	316	478	644
70	138	273	413	554	688	165	327	496	668
72	143	283	427	574	712	171	339	513	691
74	147	292	441	593	736	177	350	531	715
76	152	302	456	613	760	183	362	549	739
78	157	311	471	632	784	189	374	567	763
80	162	321	485	652	809	195	386	585	787
82	167	331	500	672	834	201	398	603	812
84	172	341	515	692	858	207	410	621	836
86	177	351	530	712	883	213	422	639	861
88	182	361	545	732	908	219	434	658	886
90	187	371	560	753	933	225	446	676	911
92	192	381	575	773	959	232	458	695	936
94	197	391	590	794	984	238	471	714	961
96	202	401	606	814	1010	244	483	732	986
98	207	411	621	835	1035	250	496	751	1012
100	213	421	637	856	1061	257	508	770	1037

Δtm (K) = difference between the mean water temperature and the room temperature

K = coefficient related to the heating body

n = = exponent related to the heating body

The thermal emissions are calculated according to the following fomula: $Q = K (\Delta tm)^n$

The tests have been carried out by Kermi GmbH laboratory in Plattling, Germany

Duck Strip 4.1 | THERMAL EMISSIONS OF DS-ST28 RADIANT PANELS

Thermal emissions for each meter according to European Standard EN 14037-3

	28-2-030	28-2-045	28-2-060	28-2-075	28-2-090	28-2-105	28-2-120	28-2-135	28-2-150
K	1,794	2,514	3,090	3,938	4,750	5,137	5,838	6,472	7,075
n	1,165	1,156	1,165	1,162	1,155	1,169	1,17	1,17	1,17
Δtm (K)	W/m	W/m	W/m	W/m	W/m	W/m	W/m	W/m	W/m
20	59	80	101	128	151	170	194	215	235
22	66	90	113	143	169	191	217	241	263
24	73	99	125	158	187	211	240	267	291
26	80	109	138	174	205	232	264	293	320
28	87	118	150	189	223	253	288	319	349
30	94	128	162	205	241	274	312	346	378
32	102	138	175	221	260	295	337	373	408
34	109	148	188	237	279	317	361	401	438
36	117	158	201	253	298	339	386	428	468
38	124	168	214	270	317	361	412	456	499
40	132	179	227	286	337	383	437	485	530
42	140	189	240	303	356	406	463	513	561
44	147	200	254	320	376	428	489	542	592
46	155	210	267	337	396	451	515	571	624
48	163	221	281	354	415	474	541	600	656
50	171	231	295	371	436	498	568	629	688
52	179	242	308	388	456	521	594	659	720
54	187	253	322	406	476	544	621	689	753
55	191	258	329	415	486	556	635	703	769
56	195	264	336	423	496	568	648	718	785
58	203	275	350	441	517	592	675	749	818
60	212	286	364	459	538	616	703	779	851
62	220	297	379	476	558	640	730	809	885
64	228	308	393	494	579	664	758	840	918
65	232	313	400	503	590	676	772	855	935
66	236	319	407	512	600	688	785	871	952
68	245	330	422	530	621	713	813	902	986
70	253	341	436	549	642	737	841	933	1020
72	262	353	451	567	664	762	870	964	1054
74	270	364	465	585	685	787	898	995	1088
76	279	375	480	604	706	812	926	1027	1123
78	287	387	495	622	728	837	955	1059	1157
80	296	398	509	641	749	862	984	1091	1192
82	304	410	524	659	771	887	1013	1123	1227
84	313	422	539	678	793	912	1042	1155	1262
86	322	433	554	697	815	938	1071	1187	1297
88	330	445	569	716	837	963	1100	1219	1333
90	339	457	584	735	859	989	1129	1252	1368
92	348	468	599	754	881	1015	1158	1284	1404
94	357	480	615	773	903	1041	1188	1317	1440
96	366	492	630	792	925	1067	1218	1350	1476
98	375	504	645	811	947	1093	1247	1383	1512
100	384	516	661	830	970	1119	1277	1416	1548

Δtm (K) = difference between the mean water temperature and the room temperature

K = coefficient related to the heating body

n = = exponent related to the heating body

The thermal emissions are calculated according to the following fomula: $Q = K (\Delta tm)^n$

The tests have been carried out by Kermi GmbH laboratory in Plattling, Germany

THERMAL EMISSIONS OF DS-ST28 RADIANT PANELS

Thermal emissions of a couple of headers according to European Standard EN 14037-3

	28-2-030	28-2-045	28-2-060	28-2-075	28-2-090	28-2-105	28-2-120	28-2-135	28-2-150
K	0,377	0,567	0,747	0,944	1,132	1,320	1,526	1,698	1,887
n	1,257	1,257	1,257	1,257	1,257	1,257	1,257	1,257	1,257
Δtm (K)	W	W	W	W	W	W	W	W	W
20	33	49	65	82	98	114	132	147	163
22	37	55	73	92	110	129	149	165	184
24	41	62	81	103	123	143	166	184	205
26	45	68	90	113	136	159	183	204	227
28	50	75	98	124	149	174	201	224	249
30	54	82	107	136	163	190	219	244	271
32	59	88	116	147	177	206	238	265	294
34	63	95	126	159	191	222	257	286	318
36	68	103	135	171	205	239	276	307	341
38	73	110	145	183	219	256	295	329	365
40	78	117	154	195	234	273	315	351	390
42	83	124	164	207	248	290	335	373	414
44	88	132	174	220	263	307	355	395	439
46	93	140	184	232	279	325	376	418	464
48	98	147	194	245	294	343	396	441	490
50	103	155	204	258	309	361	417	464	516
52	108	163	214	271	325	379	438	488	542
54	113	171	225	284	341	397	459	511	568
55	116	175	230	291	349	407	470	523	581
56	119	179	235	297	357	416	481	535	595
58	124	187	246	311	373	435	503	559	621
60	130	195	257	324	389	454	524	584	649
62	135	203	268	338	405	473	547	608	676
64	141	211	278	352	422	492	569	633	703
65	143	215	284	359	430	502	580	645	717
66	146	220	289	366	439	511	591	658	731
68	152	228	300	380	455	531	614	683	759
70	157	237	312	394	472	551	637	708	787
72	163	245	323	408	489	571	660	734	816
74	169	254	334	422	506	591	683	760	844
76	174	262	346	437	524	611	706	786	873
78	180	271	357	451	541	631	729	812	902
80	186	280	369	466	559	651	753	838	931
82	192	289	380	480	576	672	777	864	960
84	198	297	392	495	594	693	801	891	990
86	204	306	404	510	612	713	825	918	1020
88	210	315	415	525	630	734	849	944	1050
90	216	324	427	540	648	755	873	972	1080
92	222	333	439	555	666	776	898	999	1110
94	228	343	451	570	684	798	922	1026	1140
96	234	352	464	586	702	819	947	1054	1171
98	240	361	476	601	721	841	972	1081	1202
100	246	370	488	617	739	862	997	1109	1233

Δtm (K) = difference between the mean water temperature and the room temperature

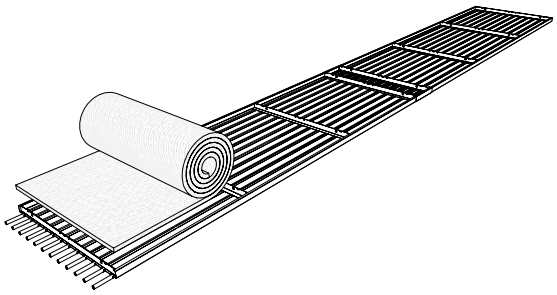
K = coefficient related to the heating body

n = = exponent related to the heating body

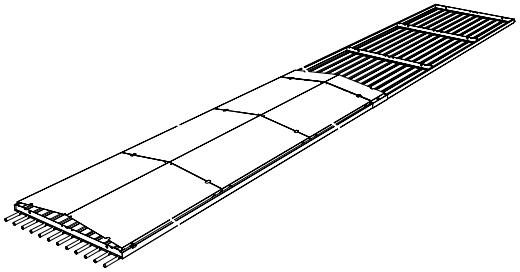
The thermal emissions are calculated according to the following fomula: $Q = K (\Delta tm)^n$

The tests have been carried out by Kermi GmbH laboratory in Plattling, Germany

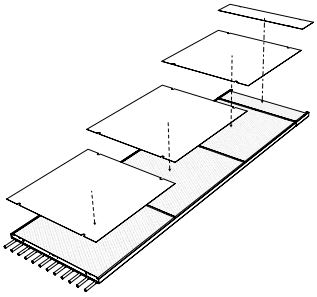
Fibreglass insulation



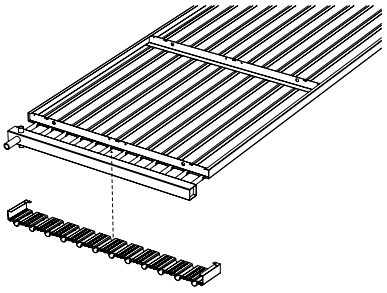
Upper cover panel for gyms



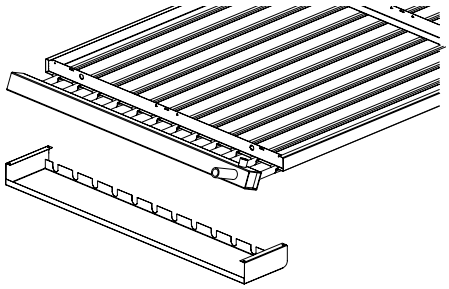
Cover panel



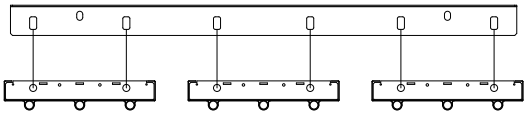
Make-up joint between panel and header



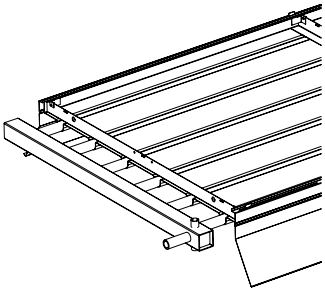
Cover panel with raised header



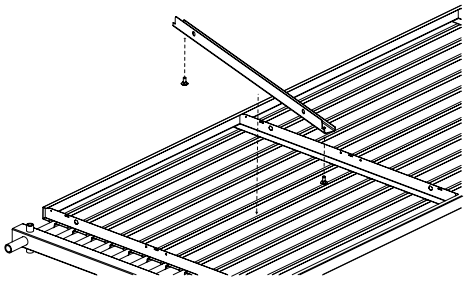
Hanging bracket for hanging multiple panels



Anti-convective side skirt



Hanging bracket (sliding)



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