

## Memo

### Ad hoc test Bridgehill fire blanket

PERSON RESPONSIBLE / AUTHOR			FOR YOUR ATTENTION	COMMENTS ARE INVITED	FOR YOUR INFORMATION	AS AGREED
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DISTRIBUTION						
Frank Brubakken, Bridgehill AS						X
PROJECT NO / FILE CODE		DATE	CLASSIFICATION			
20473		28.06.2021	Restricted			

#### Introduction

A test series was carried out to expose a fire blanket to a vehicle fire. The test was not carried out according to any test standard and is not subject to classification or certification.

#### Test subject

The test subject was a fire blanket from Bridgehill with dimensions 8 m × 6 m (L × B). According to the client the blanket was made up of graphite with a silicone mixture coating. The blanket was identical on each side. The handles on each corner of the blanket were made up of fiberglass. No data sheet was provided from the client.

The vehicle used was a petrol fuelled 2000 model Mitsubishi Carisma. All fuel and liquids were extracted from the vehicle prior to test. The fuel tank was filled with water.

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#### RISE Fire Research

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**Method**

The location of the test facilities was outdoor area of RISE Fire research' facilities in Trondheim. The surface area was concrete, and the surface was cooled down with water prior to test.

The fire was initiated by placing small containers of liquid heptane inside the vehicle. The vehicle was ignited from a distance with a cloth soaked in propane placed in the end of a rod. The target maximum temperature was approximately 900 °C before applying the blanket.

The blanket was applied for 20 minutes for the first test and 5 minutes for subsequent tests and were operated by two technician using firefighting equipment to pull the blanket on- and off the car. The test was repeated 20 times during the day of testing. The same blanket was used each time and the same side of the blanket was exposed to the fire during the entire test series. The blanket was placed in front of the car each time it was pulled off. The rare side was also an option but was not chosen due to possible conflict with instrumentation wiring.

Pallets were used in subsequent tests to ensure the fire to continue burning during the entire test day. The pallets were cut by chainsaw into smaller pieces and placed inside the car through the front and rare windows. Approximately 20 pallets were used in the test series.

After the steel temperature in the car reached a certain temperature the fire self-reignited immediately after pulling off the blanket, hence no manual ignition was necessary. During the test series, the concrete surface was cooled down a couple of times using a high-pressure water hose. After the test series the condition of the blanket was evaluated.

**Instrumentation**

Three thermocouples were mounted inside the vehicle to measure the temperatures, one in the front, one in top and on the trunk.



## **Evaluation**

After the test series a visual observation was made of the blanket. There were not conducted any quantitative measures.

### General observations

The seam was mostly intact on the entire blanket. There was a small tear on the blanket caused by the windscreen shattering on the second test. The rift was approximately 5 cm long and the length of the rift did not increase through subsequent tests. The handles were in good conditions.

### Unexposed side:

The blanket was mostly intact and in good condition.

### Fire exposed side:

The centre area that was placed directly on top of the car was a bit miscoloured and had a hardened surface. When folding this area of the blanket in any direction it did not seem crisp and kept its shape. The adjacent areas were mostly intact and had kept the original colour of the blanket.

### Conclusion

The same blanket was used to extinguish 20 consecutive car fires. The quality of the blanket was to a small degree affected by the tests. It is in RISE Fire research' opinion that the blanket could withstand several more tests with the same performance.

Best regards

Petter Eide  
Principal test engineer

## **Appendices**

- Appendix 1 – Pictures
- Appendix 2 – Graphical presentation of test data
- Appendix 3 – Test data

## Appendix 1 – Pictures



Photo 1 Instrumentation



Photo 2 Test site prior to testing

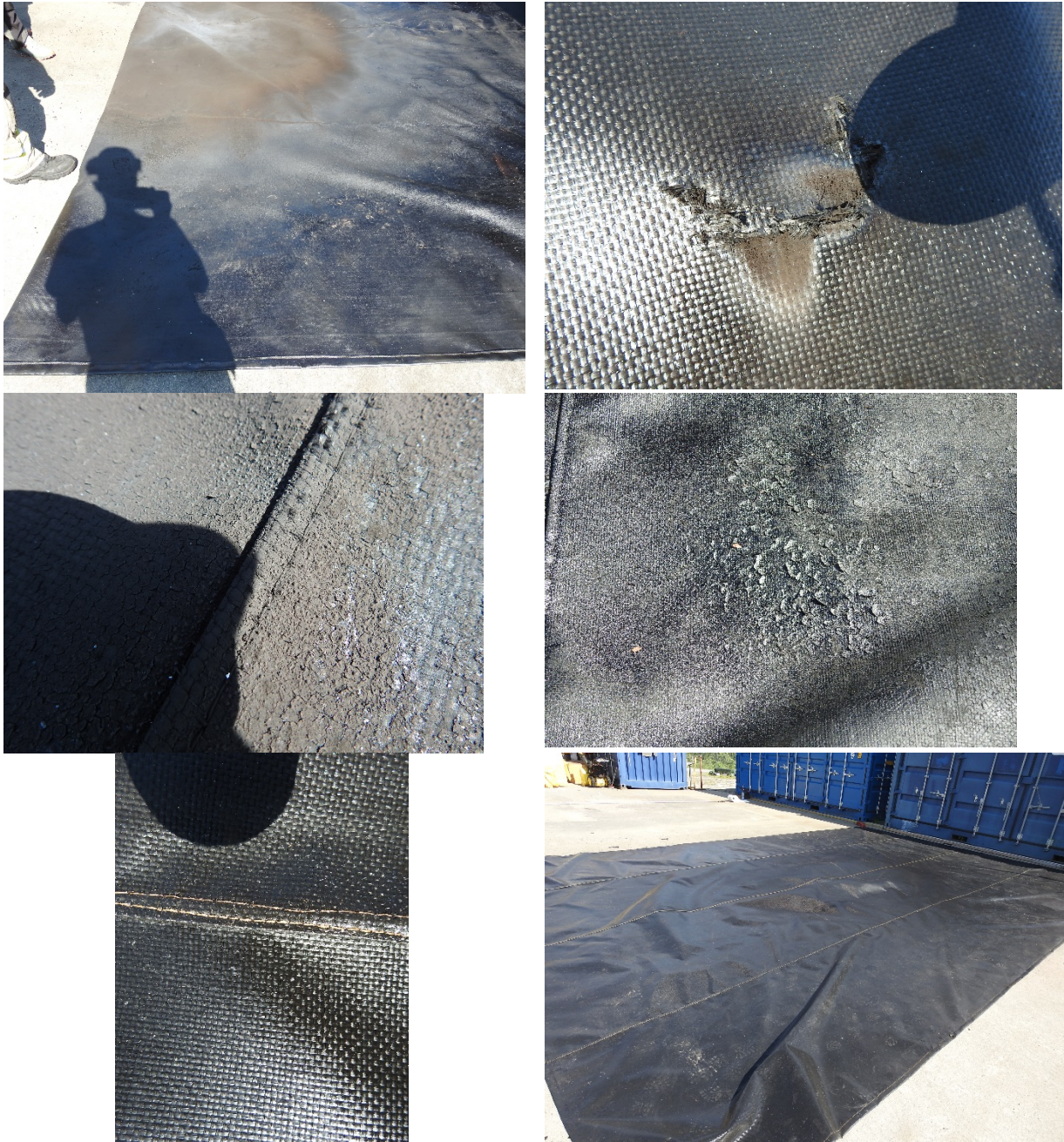






*Photo 3 Some pictures from the test series*





*Photo 4 Fire blanket after the test series. Bottom two photos from unexposed side*

Appendix 2 - Graphical presentation of test data

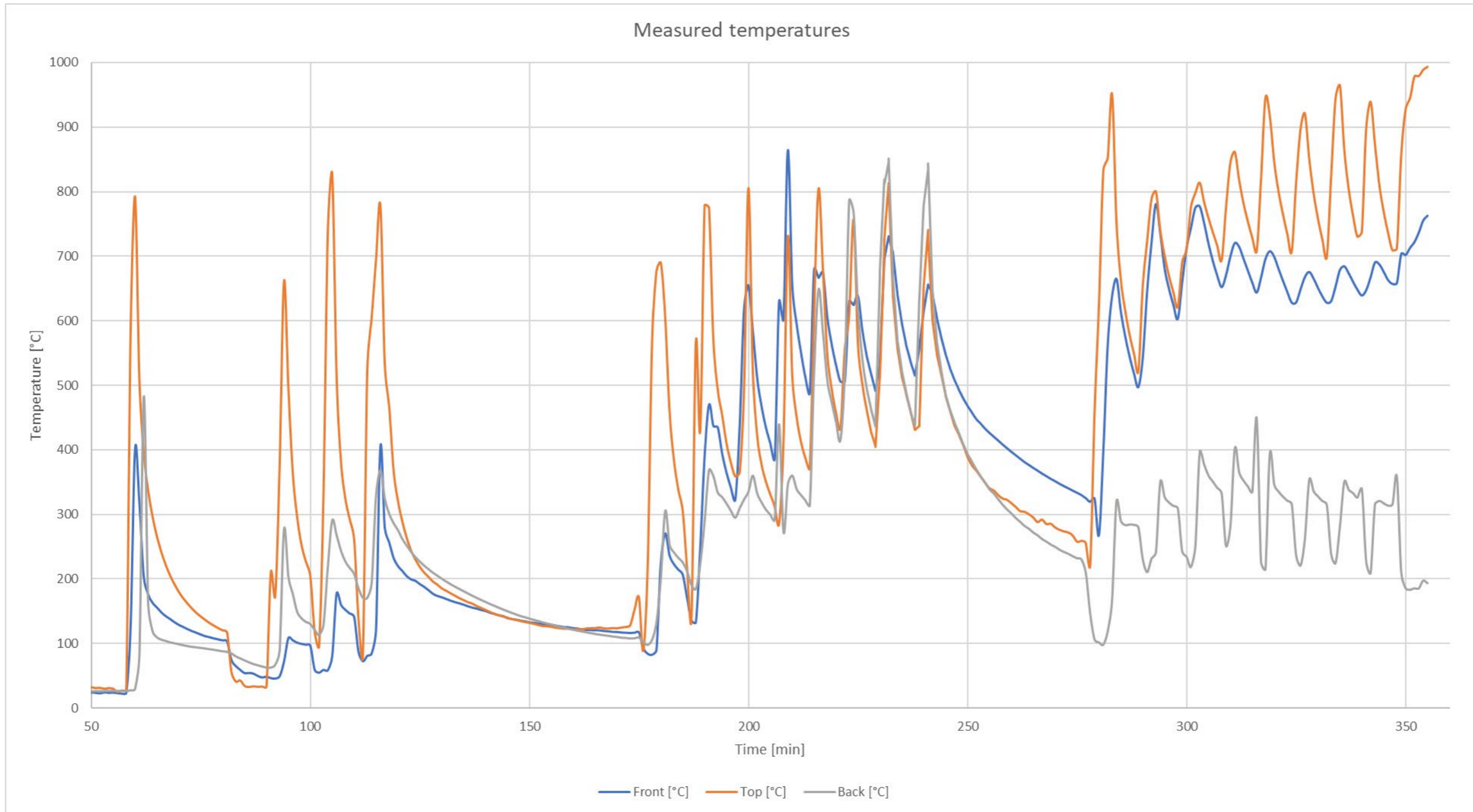


Figure 1 Measured temperatures inside vehicle. Data logging started approximately 60 minutes prior to first test.



## Appendix 3 – Test data

Table 1 Tabulated temperature data

Time [min]	Front [°C]	Top [°C]	Back [°C]
0	20	34	26
1	19	33	26
2	20	34	26
3	21	34	26
4	21	34	26
5	21	34	26
6	20	34	26
7	20	34	26
8	19	34	26
9	20	34	27
10	20	34	27
11	21	35	27
12	21	35	27
13	20	35	27
14	20	35	27
15	21	34	27
16	20	35	27
17	21	33	27
18	22	29	27
19	22	26	27
20	22	29	27
21	22	27	27
22	22	26	27
23	22	25	27
24	22	30	27
25	23	30	27
26	22	32	27
27	24	30	27
28	23	23	27
29	23	27	27
30	22	32	27
31	22	29	27
32	23	31	27
33	23	27	27
34	23	28	27
35	22	28	28
36	23	28	28
37	23	31	27



Time [min]	Front [°C]	Top [°C]	Back [°C]
38	23	21	27
39	22	30	27
40	23	28	27
41	23	27	27
42	23	26	27
43	23	25	27
44	22	30	27
45	22	29	21
46	22	26	20
47	22	32	24
48	23	28	25
49	24	31	26
50	24	32	26
51	23	31	27
52	22	31	27
53	24	30	27
54	23	31	27
55	23	30	27
56	23	25	27
57	22	27	27
58	23	29	27
59	127	584	28
60	401	793	30
61	316	508	84
62	202	395	483
63	176	337	162
64	163	297	119
65	155	266	110
66	148	242	106
67	142	222	104
68	137	205	102
69	133	192	101
70	128	180	99
71	125	170	98
72	122	162	96
73	119	154	95
74	116	147	95
75	113	142	94
76	111	137	93
77	109	132	92
78	107	128	91
79	106	124	89
80	104	120	88

Time [min]	Front [°C]	Top [°C]	Back [°C]
81	103	117	88
82	74	56	85
83	65	41	81
84	59	43	77
85	54	34	74
86	54	33	71
87	53	34	69
88	49	33	67
89	47	33	65
90	48	33	63
91	46	211	63
92	45	174	67
93	49	374	89
94	71	661	277
95	108	496	204
96	105	365	177
97	101	296	149
98	99	253	140
99	98	227	134
100	96	204	131
101	59	118	121
102	54	96	114
103	59	327	129
104	58	737	219
105	80	828	291
106	177	518	268
107	160	382	244
108	152	324	228
109	146	292	217
110	141	262	208
111	87	138	186
112	72	81	171
113	80	522	171
114	84	604	194
115	120	695	329
116	405	778	369
117	279	534	325
118	256	468	302
119	232	369	287
120	220	321	276
121	212	289	262
122	204	264	252
123	199	244	243

Time [min]	Front [°C]	Top [°C]	Back [°C]
124	197	230	234
125	192	219	227
126	187	210	221
127	182	203	216
128	177	196	210
129	173	191	206
130	171	185	201
131	169	182	197
132	166	178	192
133	164	174	189
134	162	170	185
135	160	167	181
136	157	164	178
137	155	162	174
138	154	158	171
139	151	155	168
140	150	152	165
141	147	149	162
142	146	146	159
143	143	144	156
144	142	142	153
145	139	140	151
146	138	138	148
147	136	137	145
148	135	135	143
149	134	133	141
150	132	132	139
151	132	131	137
152	131	129	135
153	130	127	133
154	129	127	131
155	128	126	130
156	127	124	128
157	126	124	126
158	125	123	125
159	125	123	123
160	123	122	122
161	123	122	120
162	122	122	119
163	121	123	118
164	120	124	117
165	120	124	115
166	120	125	114



Time [min]	Front [°C]	Top [°C]	Back [°C]
167	119	123	113
168	118	123	112
169	118	124	111
170	117	124	111
171	117	125	109
172	116	126	109
173	116	128	108
174	116	152	109
175	117	171	110
176	93	89	103
177	84	217	98
178	82	566	106
179	89	677	133
180	224	690	202
181	270	606	306
182	236	460	253
183	223	384	242
184	214	338	233
185	206	305	226
186	170	216	212
187	135	139	191
188	132	566	185
189	247	430	224
190	390	779	290
191	470	775	369
192	437	570	360
193	435	493	334
194	394	454	327
195	364	410	317
196	341	380	306
197	323	359	295
198	436	365	310
199	618	494	324
200	655	806	336
201	585	524	361
202	511	422	333
203	467	377	319
204	434	351	308
205	410	331	300
206	386	312	292
207	630	286	440
208	602	412	273
209	864	731	347

Time [min]	Front [°C]	Top [°C]	Back [°C]
210	655	516	361
211	595	451	340
212	551	413	330
213	512	388	322
214	489	372	314
215	680	619	524
216	666	805	649
217	675	681	583
218	605	549	508
219	564	495	475
220	531	457	443
221	506	434	416
222	506	556	520
223	630	609	786
224	624	757	768
225	638	564	620
226	585	502	541
227	545	462	496
227	545	462	495
228	517	428	463
228	517	428	463
229	491	406	437
229	491	405	436
230	533	515	667
230	538	512	676
231	693	711	819
231	695	725	812
232	731	814	847
232	730	809	851
233	705	639	668
233	704	636	664
234	642	558	571
234	641	558	571
235	597	515	525
235	597	514	523
236	563	488	490
236	562	486	489
237	537	460	460
237	536	460	459
238	515	431	438
238	515	431	438
239	557	437	634
239	558	437	633

Time [min]	Front [°C]	Top [°C]	Back [°C]
240	615	654	780
240	615	654	780
241	656	740	835
241	656	729	843
242	642	603	650
242	641	601	648
243	605	549	570
243	604	549	568
244	574	517	524
244	574	517	523
245	548	486	486
245	548	484	486
246	527	461	462
246	526	461	462
247	509	438	444
247	509	438	443
248	494	425	427
248	493	424	427
249	480	408	409
249	480	408	409
250	468	389	395
250	468	389	394
251	458	376	382
252	447	368	370
253	441	359	360
254	433	349	350
255	426	341	339
256	420	337	333
257	414	330	324
258	408	325	316
259	402	323	308
260	397	318	302
261	391	312	295
262	386	305	289
263	381	304	283
264	376	300	278
265	372	295	273
266	368	288	268
267	363	292	262
268	359	285	258
269	355	286	254
270	351	280	250
271	347	276	246



Time [min]	Front [°C]	Top [°C]	Back [°C]
272	344	274	242
273	340	272	239
274	337	268	236
275	333	258	233
276	330	259	231
277	325	256	210
278	319	221	147
279	324	458	106
280	268	624	102
281	398	833	99
282	562	852	119
283	638	951	168
284	665	755	320
285	614	663	290
286	575	616	284
287	544	578	285
288	518	549	284
289	497	522	280
290	542	653	231
291	646	724	211
292	721	789	232
293	781	800	242
294	735	740	351
295	681	701	327
296	649	669	319
297	624	644	314
298	603	622	310
299	660	691	243
300	712	711	235
301	744	777	219
302	775	798	251
303	777	814	397
304	751	784	378
305	720	759	361
306	692	737	351
307	670	716	342
308	652	694	333
309	671	776	252
310	700	846	282
311	720	862	402
312	714	818	366
313	696	782	353
314	677	754	344

Time [min]	Front [°C]	Top [°C]	Back [°C]
315	659	729	335
316	644	708	449
317	667	820	227
318	696	946	216
319	708	917	394
320	699	846	347
321	680	800	336
322	662	765	328
323	644	734	322
324	628	708	316
325	628	814	237
326	649	897	221
327	668	922	263
328	676	851	354
329	665	797	336
330	651	758	328
331	638	726	321
332	628	699	315
333	630	825	239
334	653	945	225
335	679	965	282
336	684	865	351
337	674	805	339
338	660	763	333
339	648	730	327
340	639	738	340
341	647	899	227
342	667	940	210
343	690	874	316
344	687	810	321
345	676	769	318
346	663	736	314
347	657	710	316
348	658	713	359
349	704	858	210
350	702	928	186
351	713	945	184
352	722	979	186
353	737	979	186
354	755	989	198
355	763	994	194