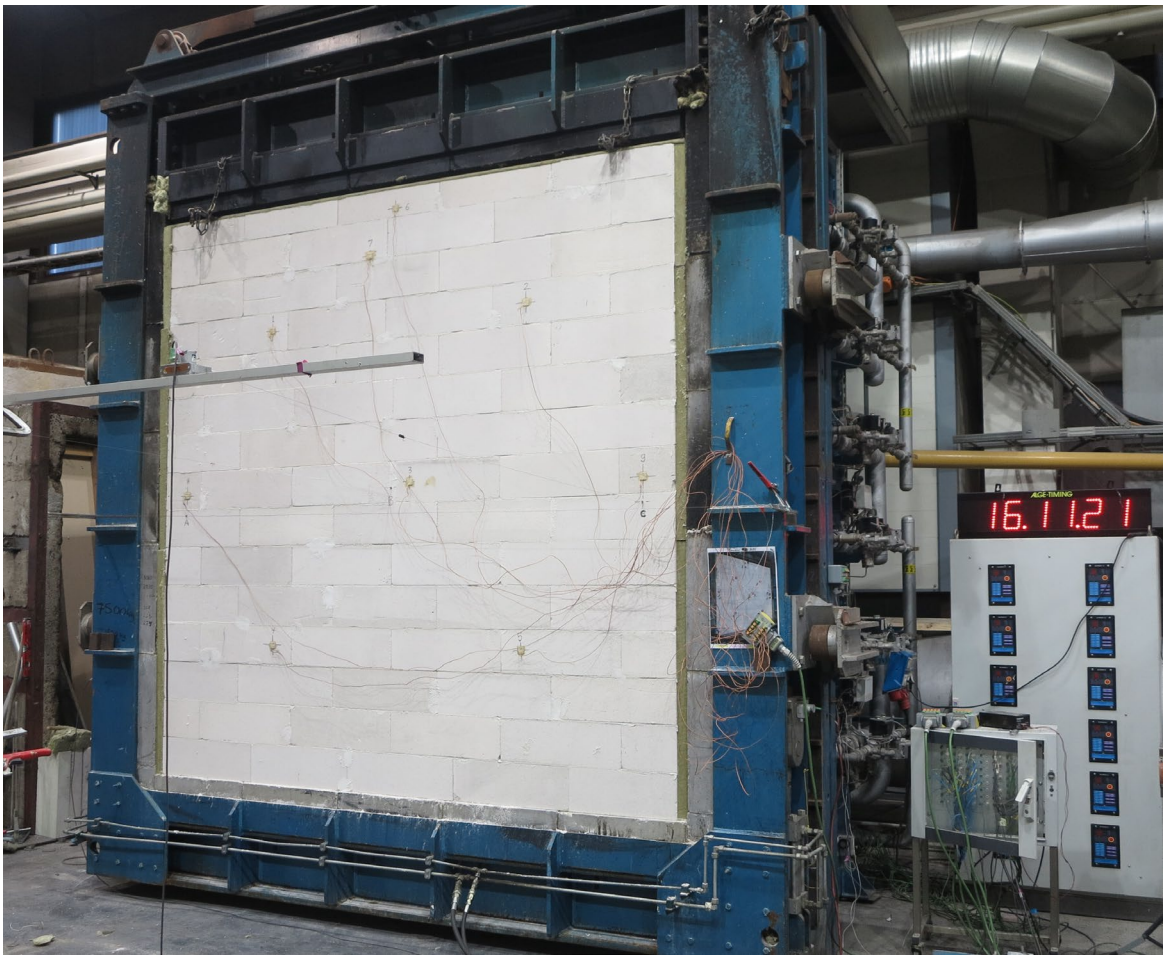
NOTE!!! This test report replaces test report no EUFI29-21004370-T1, dated November 19, 2021. Product name and installation description corrected.

Fire resistance test on a loadbearing Bauroc ECOTERM+ autoclaved aerated concrete (AAC) block wall construction



Test method: Standard EN 1365-1:2012/AC:2013 “Fire resistance tests for non-loadbearing elements – Part 1: Walls

Requested by: Bauroc AS

Test Date: November 16, 2021

Requested by	**Bauroc AS** Ivar Sikk Andja, Rakvere vald 44209 Lääne-Virumaa ESTONIA ivar.sikk@bauroc.ee
Order ref.	Order on November 15, 2021 / Ivar Sikk
Testing laboratory	**Eurofins Expert Services Oy** Kivimiehentie 4 FI-02150 Espoo Finland Contact information: Tel +358 40 636 0977, E-mail: ForenameSurname@eurofins.fi

Fire resistance test on a loadbearing Bauroc ECOTERM+ autoclaved aerated concrete (AAC) block wall construction

Test specimen

The test specimen was a loadbearing autoclaved aerated concrete block wall construction which consisted of 600 mm wide, 200 mm high and 300 mm deep Bauroc ECOTERM+ autoclaved aerated concrete blocks (nominal density 300 kg/m^3). Bauroc Thin Layer Mortar and two stripes of Murfor Compact A-40 was installed between every 4th horizontal layer of the blocks. Horizontal and vertical gaps between the blocks were filled with Bauroc Thin Layer Mortar.

The size of the specimen was w x h = 2900 mm x 2950 mm and thickness 300 mm.

Detailed information about the structure and materials of the specimen are presented in	Appendix 7
Client's drawings are presented in	Appendix 1
Date of delivery of materials	November 2, 2021
Date of assembly	November 4-5, 2021

Manufacturer had selected all the materials for the wall construction.

Date of test

November 16, 2021

Test method

Standard *EN 1365-1:2012/AC:2013 "Fire resistance tests for loadbearing elements - Part 1: Walls".*

Conditioning (clause 8 in standard SFS-EN 1365-1:2012/AC:2013):

The test construction shall be conditioned in accordance with EN 1363-1

The materials were not conditioned. Materials were stored in a test hall from the day of delivery until the construction day. Determined material properties are presented in Appendix 7.

The effects of the deviations on the test results can be neglected.

Witnesses

The test was witnessed by Minna Korpi from Jämerä Kivitalot Oy and Toomas Nilson and Esko Unga from Bauroc AS.

Test

The fire resistance test was carried out in the vertical furnace of the testing laboratory. The wall was installed to the opening of the loading test frame. The load was shared with a movable loading beam above the wall so that the wall structure was loaded with a centric line load of 50 kN/m, given by the client, up to the test time of 240 min 30 s. The load was applied by the aid of a movable loading beam.

Locations of the measuring points for temperatures of the furnace and the test specimen and pressures as well as compressions and deflections are presented in Appendix 2

Test conditions in the furnace (furnace temperature and pressure differences between the furnace and test hall) are presented in Appendices 3a and 3b

The ambient temperature in the test hall was 20 °C at the beginning of the fire resistance test.

The fire test was terminated 240 min 30 s after the start of the test by a request from the customer.

Test results

The measured specimen temperatures, compressions and deflections as well as observations and photographs are presented in the following appendices:

Temperatures of the test specimen	Appendix 4
Observations, compressions and deflections	Appendix 5
Photographs	Appendix 6

Test results with respect to the performance criteria imposed by the standard EN 13501-2:2016 complemented with EN 1365-1:2012/AC:2013 and EN 1363-1:2020 are presented in table 1.

Table 1. Test results of with respect to the criteria.

Property	Test result		
Loadbearing capacity R	Imposed load: line load 50 kN/m		
Vertical contraction (criterion: ≤ h/100 mm = 29.5 mm)	Not exceded		
Rate of vertical contraction (criterion: ≤ 3h/1000 mm/min = 8.9 mm/min)	Not exceded		
Integrity E			
Occurrence of flames: *(criterion: no sustained flaming in excess of 10 s duration)*	Not observed		
Cotton pad test: *(criterion: no ignition)*	Not done		
Gap gauge test: *(criterion: through-going Ø 6 mm must not move over 150 mm along the gap; Ø 25 mm must not penetrate the specimen)*	Not done		
Insulation I	**Test time** [min]		
	120 min	180 min	240 min
	ΔT(number of tc)		
Average temperature rise: *(criterion: ΔT ≤ 140 °C),* tc1...tc5	0 °C	3 °C	16 °C
Highest temperature rise: *(criterion: ΔT ≤ 180 °C),* tc1...tc9	0°C (3,4,5,6,8)	4 °C (4)	20 °C (6)

Summary

The test specimen was a loadbearing block wall construction which consisted of 600 mm wide, 200 mm high and 300 mm deep Bauroc ECOTERM+ autoclaved aerated concrete blocks (nominal density 300 kg/m^3). Thin Layer Mortar and two stripes of Murfor Compact A-40 was installed between every 4th horizontal layer of the blocks. Horizontal and vertical gaps between the blocks were filled with Bauroc Thin Layer Mortar. Loadbearing wall construction was mounted to the opening of a loading test frame. The size of the opening was 3060 x 2710 mm. The load was shared with a movable loading beam above the wall so that the wall structure was loaded with a centric line load of 50 kN/m, given by the client, up to the test time of 240 min 30 s.

The wall met in the fire resistance test the performance criteria imposed by the standards EN 13501-2:2016 complemented with EN 1365-1:2012/AC:2013 and EN 1363-1:2020 as follows:

Loadbearing capacity R	
-vertical contraction	240 minutes*)
-rate of vertical contraction	240 minutes*)
Integrity E	
-sustained flaming	240 minutes*)
-gap gauge test	240 minutes*)
-cotton pad	240 minutes*)
Insulation I	
- average temperature rise	240 minutes*)
- maximum temperature rise	240 minutes*)

This report details method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in EN 1365-1:2012/AC:2013 and where appropriate EN 1363-1:2020. Any significant deviation with respect to size, constructional details, loads, stresses and edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.

Because of the nature of the fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy on the result.

Application of test results

Certain modifications mentioned in the chapter 13 of standard SFS-EN 1365-1:2012/AC:2013 can be allowed on the basis of the test results. These modifications can be done without a separate assessment or approval on the fire resistance.

Eurofins Expert Services Oy is notified body No. 0809 under the Construction Products Regulation (CPR).

Espoo, 25.11.2021

Ville Grönvall
Senior Expert

Teemu Vesala
Senior Expert

NOTE!!! This test report replaces test report no EUFI29-21004370-T1, dated November 19, 2021. Product name and installation description corrected.

APPENDICES	Appendix 1	Drawings of the structure
	Appendix 2	Location of measuring points for temperatures, pressures and deformations
	Appendices 3a and 3b	Furnace temperature and pressure difference
	Appendix 4	Temperatures of the test specimen
	Appendix 5	Observations, compressions and deformations
	Appendix 6	Photographs
	Appendix 7	Information of construction and determined material properties

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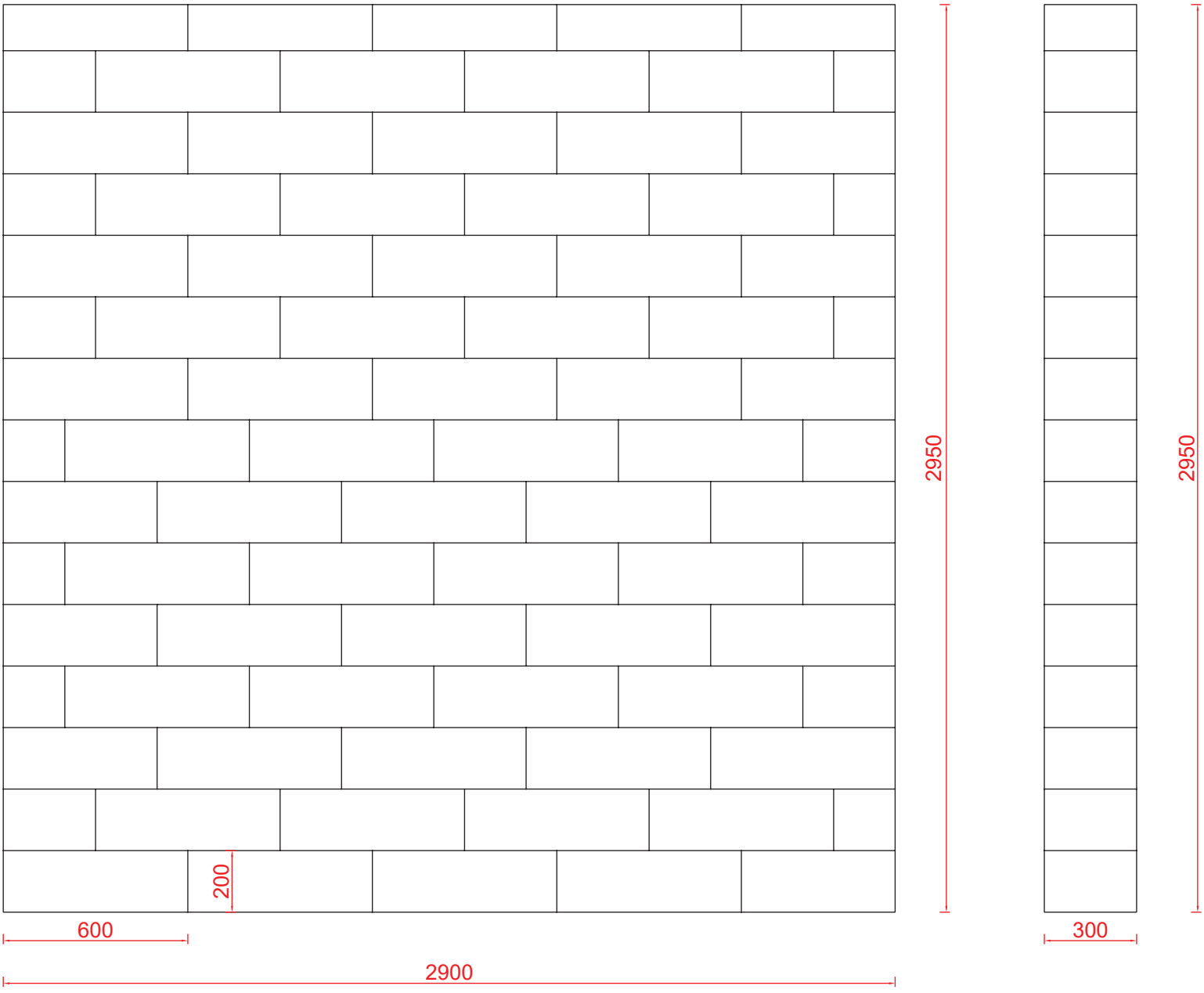
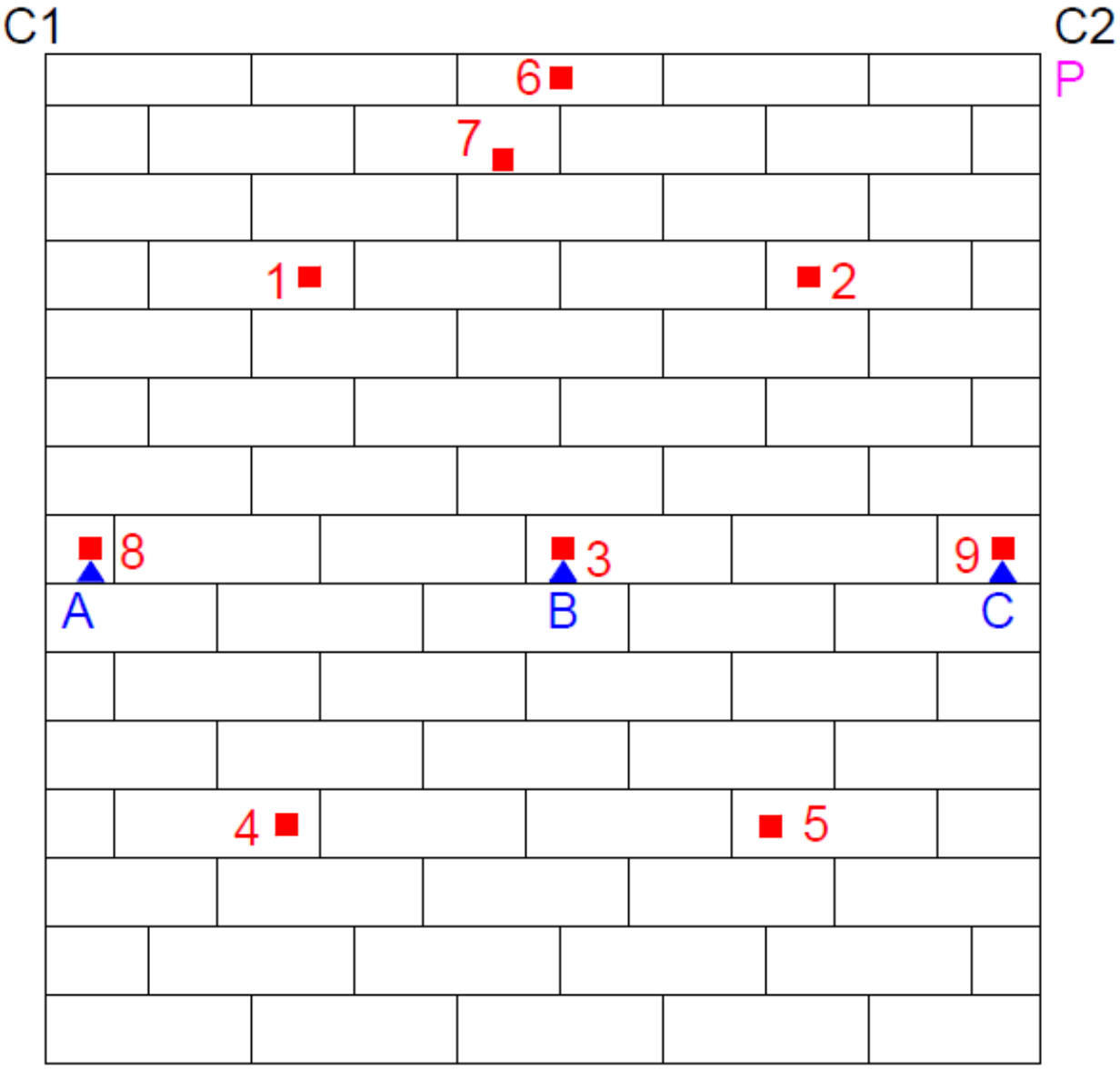
Teemu Vesala



Test arrangement



1-9 = Temperature on the unexposed surface of the test specimen
A-C = Deflection of the test specimen
C1-C2 = Vertical contraction measurement point
P = Pressure difference between the furnace and test hall

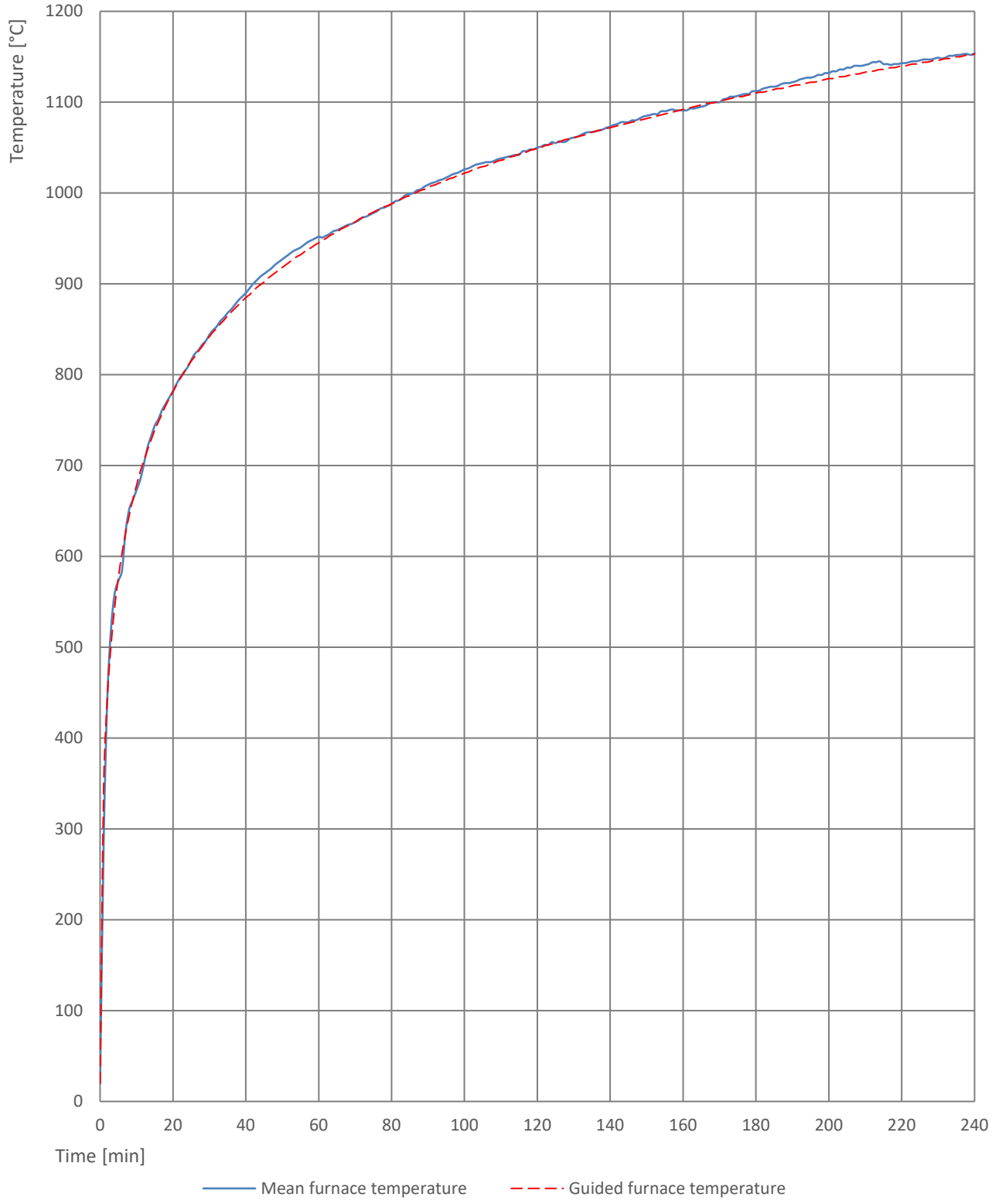


Figure 1. Furnace temperature.

Table 1. Furnace temperature.

Time [min]	Mean furnace temp. [°C]	Guiding furnace temp. [°C]	Min [°C]	Max [°C]	A [°C · min]	As [°C · min]	d [%]	Max d [%]
0	20	20	20	20	0	0	0	-
1	288	349	270	318	154	184	-16.3	-
2	445	445	424	472	521	581	-10.3	-
3	520	502	494	544	1004	1055	-4.8	-
4	559	544	534	581	1544	1578	-2.1	-
5	573	576	551	599	2110	2138	-1.3	-
6	584	603	565	611	2690	2727	-1.4	15.0
7	627	626	600	659	3296	3342	-1.4	15.0
8	652	645	624	683	3935	3977	-1.0	15.0
9	662	663	632	695	4593	4631	-0.8	15.0
10	673	678	645	706	5261	5302	-0.8	15.0
11	684	693	650	714	5940	5987	-0.8	14.5
12	701	705	671	732	6633	6686	-0.8	14.0
13	720	717	687	751	7343	7397	-0.7	13.5
14	732	728	701	761	8070	8120	-0.6	13.0
15	744	739	708	773	8808	8853	-0.5	12.5
16	751	748	720	781	9556	9597	-0.4	12.0
17	761	757	727	789	10312	10349	-0.4	11.5
18	768	766	735	796	11076	11111	-0.3	11.0
19	775	774	742	802	11848	11881	-0.3	10.5
20	782	781	747	808	12627	12658	-0.2	10.0
21	790	789	755	816	13414	13443	-0.2	9.5
22	797	796	761	823	14208	14236	-0.2	9.0
23	803	802	768	830	15008	15035	-0.2	8.5
24	808	809	775	833	15814	15840	-0.2	8.0
25	816	815	780	843	16626	16652	-0.2	7.5
26	823	820	786	847	17446	17470	-0.1	7.0
27	827	826	792	853	18272	18293	-0.1	6.5
28	833	831	800	856	19102	19121	-0.1	6.0
29	837	837	805	861	19937	19955	-0.1	5.5
30	844	842	809	866	20778	20795	-0.1	5.0
31	849	847	813	874	21625	21639	-0.1	4.9
32	853	851	818	877	22476	22488	-0.1	4.8
33	859	856	822	881	23333	23342	0.0	4.8
34	863	860	828	886	24194	24200	0.0	4.7
35	868	865	831	891	25060	25062	0.0	4.6
36	872	869	837	895	25930	25929	0.0	4.5
37	877	873	841	900	26805	26800	0.0	4.4
38	882	877	848	905	27684	27675	0.0	4.3
39	886	881	852	910	28569	28554	0.1	4.3
40	890	885	856	915	29457	29437	0.1	4.2

Time [min]	Mean furnace temp. [°C]	Guiding furnace temp. [°C]	Min [°C]	Max [°C]	A [°C · min]	As [°C · min]	d [%]	Max d [%]
41	895	888	861	918	30351	30324	0.1	4.1
42	900	892	865	922	31249	31214	0.1	4.0
43	904	896	869	925	32151	32108	0.1	3.9
44	908	899	874	929	33058	33005	0.2	3.8
45	911	902	878	931	33968	33906	0.2	3.8
46	914	906	880	936	34881	34810	0.2	3.7
47	917	909	883	938	35797	35717	0.2	3.6
48	921	912	887	943	36716	36628	0.2	3.5
49	924	915	892	944	37639	37541	0.3	3.4
50	927	918	894	946	38565	38458	0.3	3.3
51	930	921	900	949	39494	39377	0.3	3.3
52	933	924	902	952	40426	40300	0.3	3.2
53	936	927	907	955	41361	41225	0.3	3.1
54	938	930	909	956	42299	42154	0.3	3.0
55	940	932	910	959	43238	43085	0.4	2.9
56	943	935	912	962	44180	44018	0.4	2.8
57	946	938	915	966	45125	44955	0.4	2.8
58	948	940	917	967	46073	45894	0.4	2.7
59	950	943	919	969	47023	46835	0.4	2.6
60	952	945	921	972	47975	47779	0.4	2.5
61	951	948	920	969	48927	48726	0.4	2.5
62	953	950	924	972	49879	49675	0.4	2.5
63	955	953	925	973	50834	50626	0.4	2.5
64	958	955	928	975	51790	51580	0.4	2.5
65	959	957	928	977	52749	52536	0.4	2.5
66	961	960	929	980	53709	53495	0.4	2.5
67	963	962	932	982	54671	54456	0.4	2.5
68	965	964	934	983	55635	55419	0.4	2.5
69	966	966	935	985	56601	56384	0.4	2.5
70	968	968	938	986	57569	57351	0.4	2.5
71	970	971	940	989	58538	58320	0.4	2.5
72	973	973	943	990	59510	59292	0.4	2.5
73	974	975	945	993	60484	60266	0.4	2.5
74	976	977	946	994	61459	61242	0.4	2.5
75	978	979	947	998	62436	62220	0.3	2.5
76	980	981	950	997	63415	63200	0.3	2.5
77	983	983	954	1002	64397	64182	0.3	2.5
78	984	985	954	1003	65381	65166	0.3	2.5
79	986	986	957	1005	66366	66152	0.3	2.5
80	988	988	960	1008	67354	67139	0.3	2.5
81	991	990	962	1011	68344	68128	0.3	2.5
82	992	992	964	1012	69336	69119	0.3	2.5

Time [min]	Mean furnace temp. [°C]	Guiding furnace temp. [°C]	Min [°C]	Max [°C]	A [°C · min]	As [°C · min]	d [%]	Max d [%]
83	995	994	965	1014	70330	70112	0.3	2.5
84	998	996	970	1018	71326	71107	0.3	2.5
85	999	997	970	1018	72325	72103	0.3	2.5
86	1000	999	971	1019	73325	73101	0.3	2.5
87	1003	1001	972	1023	74327	74101	0.3	2.5
88	1004	1003	975	1023	75331	75103	0.3	2.5
89	1007	1004	979	1024	76337	76107	0.3	2.5
90	1009	1006	980	1029	77346	77112	0.3	2.5
91	1011	1008	982	1030	78356	78119	0.3	2.5
92	1012	1009	985	1031	79368	79127	0.3	2.5
93	1014	1011	986	1033	80382	80137	0.3	2.5
94	1015	1012	988	1032	81397	81149	0.3	2.5
95	1017	1014	990	1036	82413	82162	0.3	2.5
96	1019	1016	993	1037	83432	83177	0.3	2.5
97	1021	1017	995	1039	84453	84193	0.3	2.5
98	1022	1019	995	1040	85475	85211	0.3	2.5
99	1024	1020	997	1045	86499	86231	0.3	2.5
100	1026	1022	999	1047	87524	87252	0.3	2.5
101	1027	1023	1000	1046	88551	88274	0.3	2.5
102	1029	1025	1003	1049	89579	89298	0.3	2.5
103	1031	1026	1005	1051	90609	90324	0.3	2.5
104	1032	1028	1006	1052	91641	91351	0.3	2.5
105	1033	1029	1006	1053	92674	92379	0.3	2.5
106	1034	1030	1009	1053	93707	93409	0.3	2.5
107	1034	1032	1009	1053	94742	94440	0.3	2.5
108	1035	1033	1009	1054	95777	95472	0.3	2.5
109	1037	1035	1010	1055	96814	96506	0.3	2.5
110	1038	1036	1013	1058	97852	97542	0.3	2.5
111	1039	1037	1014	1058	98891	98578	0.3	2.5
112	1040	1039	1015	1059	99931	99616	0.3	2.5
113	1041	1040	1016	1059	100972	100656	0.3	2.5
114	1042	1041	1018	1059	102014	101696	0.3	2.5
115	1042	1043	1018	1058	103056	102738	0.3	2.5
116	1046	1044	1022	1065	104100	103782	0.3	2.5
117	1046	1045	1022	1064	105147	104826	0.3	2.5
118	1048	1047	1024	1067	106194	105872	0.3	2.5
119	1048	1048	1025	1066	107243	106920	0.3	2.5
120	1050	1049	1026	1069	108292	107968	0.3	2.5
121	1051	1050	1027	1070	109343	109018	0.3	2.5
122	1053	1052	1029	1071	110396	110069	0.3	2.5
123	1053	1053	1031	1071	111449	111121	0.3	2.5
124	1056	1054	1034	1074	112504	112175	0.3	2.5

Time [min]	Mean furnace temp. [°C]	Guiding furnace temp. [°C]	Min [°C]	Max [°C]	A [°C · min]	As [°C · min]	d [%]	Max d [%]
125	1055	1055	1032	1072	113559	113229	0.3	2.5
126	1057	1056	1035	1076	114616	114285	0.3	2.5
127	1056	1058	1032	1075	115673	115342	0.3	2.5
128	1057	1059	1032	1076	116730	116400	0.3	2.5
129	1060	1060	1037	1080	117789	117460	0.3	2.5
130	1061	1061	1038	1080	118850	118520	0.3	2.5
131	1062	1062	1038	1080	119912	119582	0.3	2.5
132	1064	1063	1041	1082	120975	120644	0.3	2.5
133	1066	1064	1042	1083	122040	121708	0.3	2.5
134	1067	1066	1044	1083	123107	122773	0.3	2.5
135	1067	1067	1044	1085	124174	123839	0.3	2.5
136	1068	1068	1045	1085	125242	124907	0.3	2.5
137	1069	1069	1046	1087	126311	125975	0.3	2.5
138	1070	1070	1047	1087	127381	127045	0.3	2.5
139	1072	1071	1050	1090	128452	128115	0.3	2.5
140	1073	1072	1050	1091	129525	129187	0.3	2.5
141	1075	1073	1052	1093	130600	130259	0.3	2.5
142	1076	1074	1053	1094	131676	131333	0.3	2.5
143	1078	1075	1055	1095	132753	132407	0.3	2.5
144	1078	1076	1057	1097	133831	133483	0.3	2.5
145	1078	1077	1056	1097	134910	134559	0.3	2.5
146	1080	1078	1058	1098	135989	135637	0.3	2.5
147	1080	1079	1058	1098	137069	136715	0.3	2.5
148	1082	1080	1060	1101	138151	137795	0.3	2.5
149	1084	1081	1063	1102	139235	138875	0.3	2.5
150	1085	1082	1063	1105	140320	139957	0.3	2.5
151	1086	1083	1064	1105	141406	141039	0.3	2.5
152	1087	1084	1066	1105	142493	142123	0.3	2.5
153	1087	1085	1065	1106	143581	143207	0.3	2.5
154	1090	1086	1067	1108	144670	144293	0.3	2.5
155	1090	1087	1067	1109	145761	145379	0.3	2.5
156	1091	1088	1068	1110	146852	146467	0.3	2.5
157	1092	1089	1071	1110	147943	147555	0.3	2.5
158	1091	1090	1071	1110	149035	148645	0.3	2.5
159	1091	1091	1072	1112	150126	149735	0.3	2.5
160	1091	1092	1067	1113	151217	150827	0.3	2.5
161	1091	1093	1062	1114	152309	151919	0.3	2.5
162	1093	1094	1064	1116	153401	153013	0.3	2.5
163	1093	1095	1064	1115	154494	154107	0.3	2.5
164	1094	1096	1063	1116	155588	155203	0.2	2.5
165	1095	1097	1065	1118	156683	156299	0.2	2.5
166	1096	1098	1066	1118	157779	157397	0.2	2.5

Time [min]	Mean furnace temp. [°C]	Guiding furnace temp. [°C]	Min [°C]	Max [°C]	A [°C · min]	As [°C · min]	d [%]	Max d [%]
167	1098	1099	1069	1120	158877	158495	0.2	2.5
168	1100	1099	1072	1121	159976	159594	0.2	2.5
169	1100	1100	1071	1121	161076	160694	0.2	2.5
170	1100	1101	1073	1122	162176	161794	0.2	2.5
171	1103	1102	1078	1124	163278	162896	0.2	2.5
172	1104	1103	1078	1125	164382	163998	0.2	2.5
173	1106	1104	1079	1127	165487	165102	0.2	2.5
174	1106	1105	1079	1126	166593	166206	0.2	2.5
175	1107	1106	1080	1129	167700	167312	0.2	2.5
176	1108	1106	1081	1129	168808	168418	0.2	2.5
177	1109	1107	1084	1129	169917	169524	0.2	2.5
178	1109	1108	1083	1130	171026	170632	0.2	2.5
179	1112	1109	1086	1133	172137	171740	0.2	2.5
180	1112	1110	1087	1133	173249	172850	0.2	2.5
181	1113	1111	1086	1134	174363	173960	0.2	2.5
182	1115	1111	1087	1136	175477	175071	0.2	2.5
183	1116	1112	1087	1137	176593	176183	0.2	2.5
184	1117	1113	1090	1137	177709	177295	0.2	2.5
185	1117	1114	1092	1138	178826	178409	0.2	2.5
186	1118	1115	1094	1138	179944	179523	0.2	2.5
187	1120	1115	1099	1139	181064	180638	0.2	2.5
188	1121	1116	1101	1140	182184	181754	0.2	2.5
189	1121	1117	1102	1142	183305	182870	0.2	2.5
190	1122	1118	1103	1142	184428	183988	0.2	2.5
191	1123	1119	1104	1142	185551	185106	0.2	2.5
192	1125	1119	1105	1144	186676	186225	0.2	2.5
193	1126	1120	1106	1145	187801	187345	0.2	2.5
194	1127	1121	1106	1147	188929	188465	0.2	2.5
195	1127	1122	1107	1146	190056	189587	0.2	2.5
196	1128	1122	1108	1146	191184	190709	0.2	2.5
197	1130	1123	1108	1148	192314	191831	0.3	2.5
198	1130	1124	1111	1148	193444	192955	0.3	2.5
199	1132	1125	1111	1150	194576	194079	0.3	2.5
200	1132	1126	1112	1150	195709	195205	0.3	2.5
201	1134	1126	1113	1151	196842	196331	0.3	2.5
202	1134	1127	1113	1152	197977	197457	0.3	2.5
203	1136	1128	1114	1156	199112	198585	0.3	2.5
204	1136	1128	1115	1155	200249	199713	0.3	2.5
205	1138	1129	1117	1156	201387	200841	0.3	2.5
206	1138	1130	1117	1156	202525	201971	0.3	2.5
207	1140	1131	1117	1159	203664	203101	0.3	2.5
208	1140	1131	1119	1159	204805	204232	0.3	2.5

Time [min]	Mean furnace temp. [°C]	Guiding furnace temp. [°C]	Min [°C]	Max [°C]	A [°C · min]	As [°C · min]	d [%]	Max d [%]
209	1140	1132	1120	1157	205945	205364	0.3	2.5
210	1141	1133	1122	1158	207086	206496	0.3	2.5
211	1142	1134	1121	1158	208228	207630	0.3	2.5
212	1144	1134	1122	1161	209371	208764	0.3	2.5
213	1144	1135	1123	1162	210515	209898	0.3	2.5
214	1145	1136	1124	1162	211661	211034	0.3	2.5
215	1142	1136	1122	1158	212805	212170	0.3	2.5
216	1142	1137	1122	1158	213947	213306	0.3	2.5
217	1141	1138	1121	1159	215090	214444	0.3	2.5
218	1142	1138	1121	1157	216232	215582	0.3	2.5
219	1142	1139	1121	1159	217374	216720	0.3	2.5
220	1143	1140	1122	1160	218516	217860	0.3	2.5
221	1143	1140	1122	1160	219660	219000	0.3	2.5
222	1144	1141	1124	1160	220804	220140	0.3	2.5
223	1145	1142	1124	1159	221949	221282	0.3	2.5
224	1145	1142	1123	1160	223095	222424	0.3	2.5
225	1146	1143	1126	1158	224240	223566	0.3	2.5
226	1147	1144	1125	1161	225387	224710	0.3	2.5
227	1147	1144	1126	1161	226534	225854	0.3	2.5
228	1147	1145	1126	1162	227682	226998	0.3	2.5
229	1148	1146	1127	1163	228830	228144	0.3	2.5
230	1149	1146	1127	1162	229979	229290	0.3	2.5
231	1148	1147	1128	1162	231127	230436	0.3	2.5
232	1149	1148	1128	1164	232276	231584	0.3	2.5
233	1151	1148	1129	1164	233427	232732	0.3	2.5
234	1151	1149	1129	1165	234578	233880	0.3	2.5
235	1152	1150	1131	1166	235729	235030	0.3	2.5
236	1152	1150	1130	1166	236882	236180	0.3	2.5
237	1153	1151	1131	1165	238035	237330	0.3	2.5
238	1153	1152	1132	1166	239188	238482	0.3	2.5
239	1152	1152	1131	1167	240341	239634	0.3	2.5
240	1154	1153	1134	1167	241494	240786	0.3	2.5

Where
A is area under the actual average furnace time-temperature curve
As is the area under the standard (guiding) time-temperature curve
d is deviation
Max d is highest acceptable deviation

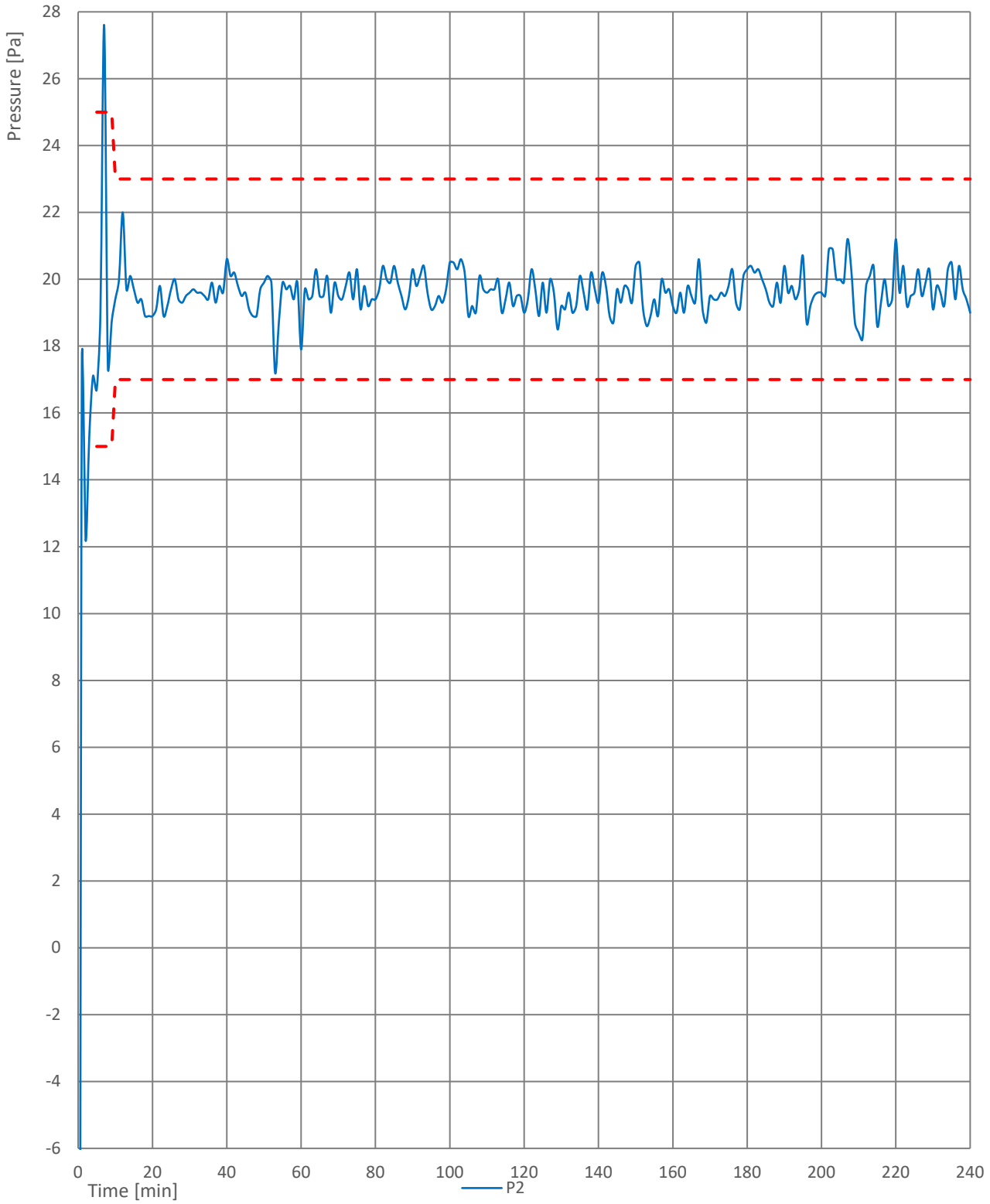


Figure 1. Pressure difference.

Temperatures of the test specimen

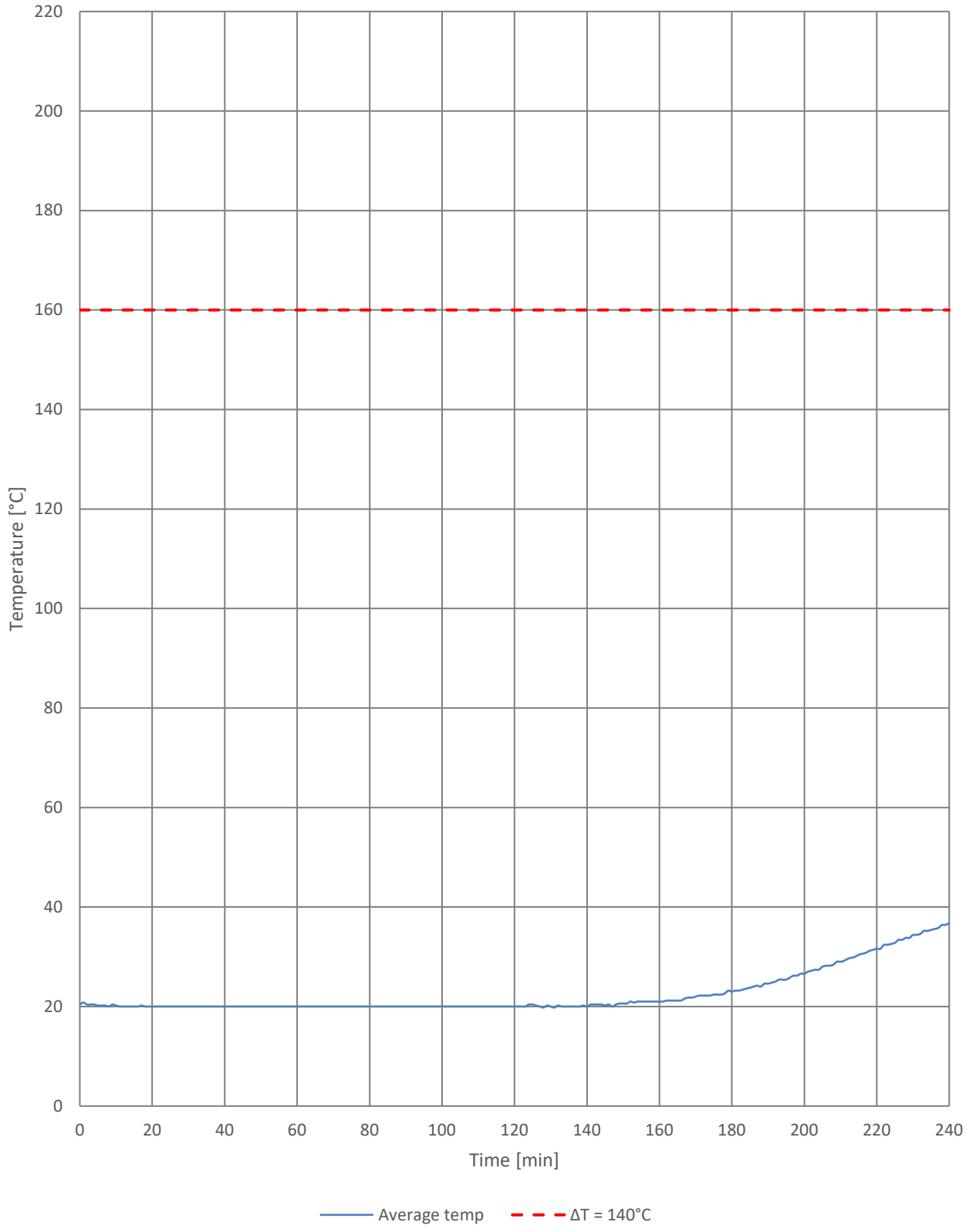


Figure 1. Measured specimen temperature. Mean of thermocouples TC1…TC5.

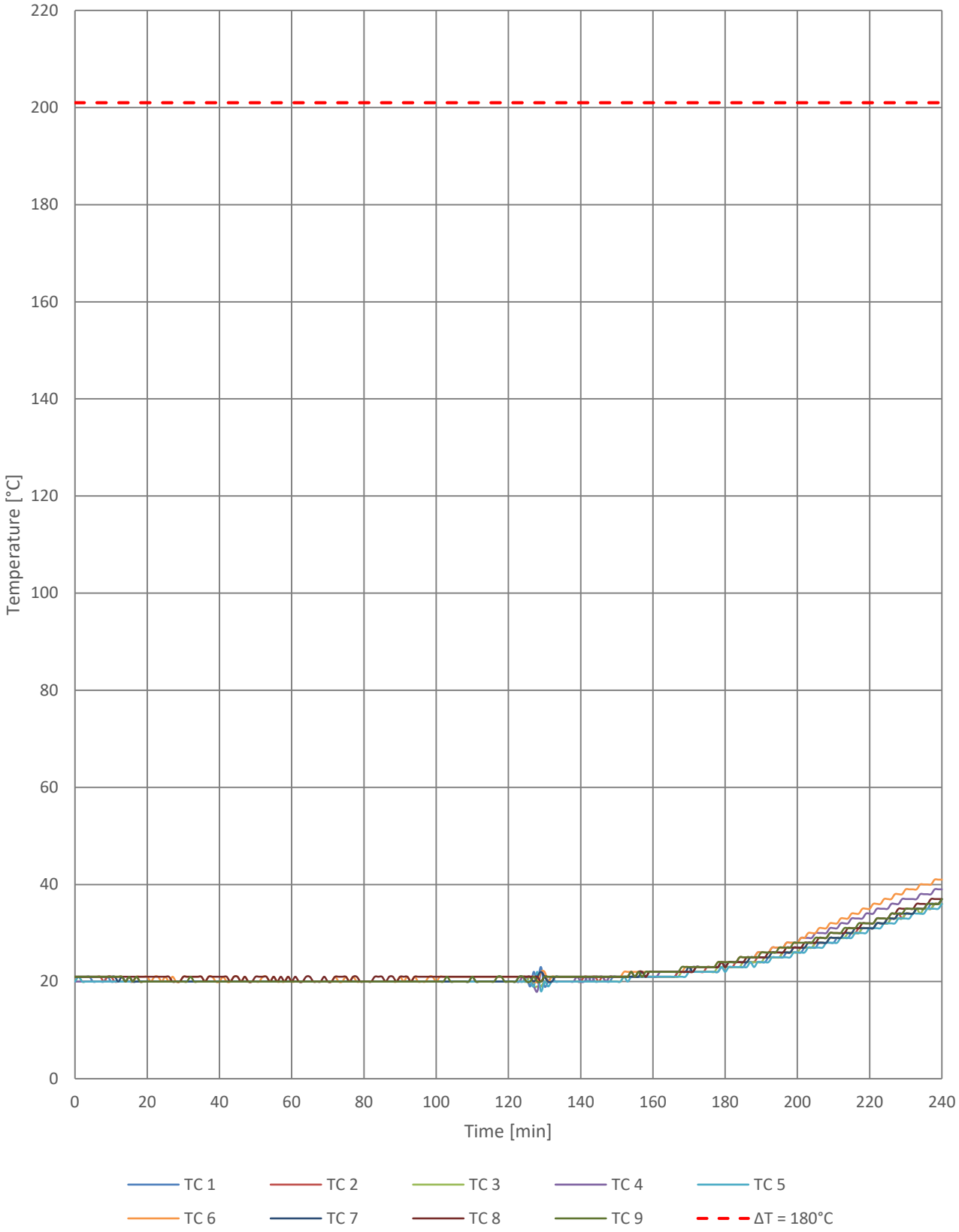


Figure 2. Measured specimen surface temperatures, TC1…TC9.

Table 1. Measured individual specimen temperatures

Time (min)	tc1 (°C)	tc2 (°C)	tc3 (°C)	tc4 (°C)	tc5 (°C)	Mean (tc1–tc5) (°C)	tc6 (°C)	tc7 (°C)	tc8 (°C)	tc9 (°C)
0	21	21	20	20	20	20	21	21	21	21
1	21	21	21	20	21	21	21	21	21	21
2	21	21	20	20	20	20	21	21	21	21
3	21	21	20	20	20	20	21	21	21	21
4	21	21	20	20	20	20	21	21	21	21
5	20	21	20	20	20	20	21	21	21	21
6	20	21	20	20	20	20	21	21	21	21
7	20	21	20	20	20	20	21	21	21	21
8	20	20	20	20	20	20	21	21	21	21
9	21	21	20	20	20	20	21	21	21	21
10	20	21	20	20	20	20	21	21	21	21
11	20	20	20	20	20	20	21	21	21	21
12	20	20	20	20	20	20	21	20	21	21
13	20	20	20	20	20	20	21	21	21	21
14	20	20	20	20	20	20	20	20	21	20
15	20	20	20	20	20	20	21	21	21	21
16	20	20	20	20	20	20	20	20	21	20
17	20	21	20	20	20	20	21	20	21	21
18	20	20	20	20	20	20	21	20	21	20
19	20	20	20	20	20	20	21	20	21	20
20	20	20	20	20	20	20	21	20	21	20
21	20	20	20	20	20	20	20	20	21	20
22	20	20	20	20	20	20	21	20	21	20
23	20	20	20	20	20	20	21	20	21	20
24	20	20	20	20	20	20	20	20	21	20
25	20	20	20	20	20	20	21	20	21	20
26	20	20	20	20	20	20	20	20	21	20
27	20	20	20	20	20	20	21	20	20	20
28	20	20	20	20	20	20	20	20	20	20
29	20	20	20	20	20	20	20	20	20	20
30	20	20	20	20	20	20	21	20	21	20
31	20	20	20	20	20	20	21	20	21	20
32	20	20	20	20	20	20	21	20	21	21
33	20	20	20	20	20	20	21	20	21	20
34	20	20	20	20	20	20	21	20	21	20
35	20	20	20	20	20	20	21	20	21	20
36	20	20	20	20	20	20	20	20	20	20
37	20	20	20	20	20	20	21	20	21	20
38	20	20	20	20	20	20	21	20	21	20
39	20	20	20	20	20	20	20	20	21	20
40	20	20	20	20	20	20	20	20	21	20
41	20	20	20	20	20	20	21	20	21	20
42	20	20	20	20	20	20	20	20	21	20
43	20	20	20	20	20	20	20	20	20	20

Time (min)	tc1 (°C)	tc2 (°C)	tc3 (°C)	tc4 (°C)	tc5 (°C)	Mean (tc1–tc5) (°C)	tc6 (°C)	tc7 (°C)	tc8 (°C)	tc9 (°C)
44	20	20	20	20	20	20	21	20	21	20
45	20	20	20	20	20	20	21	20	21	20
46	20	20	20	20	20	20	20	20	20	20
47	20	20	20	20	20	20	21	20	21	20
48	20	20	20	20	20	20	20	20	20	20
49	20	20	20	20	20	20	20	20	20	20
50	20	20	20	20	20	20	20	20	21	20
51	20	20	20	20	20	20	20	20	21	20
52	20	20	20	20	20	20	21	20	21	20
53	20	20	20	20	20	20	21	20	21	20
54	20	20	20	20	20	20	20	20	20	20
55	20	20	20	20	20	20	21	20	21	20
56	20	20	20	20	20	20	20	20	20	20
57	20	20	20	20	20	20	20	20	21	20
58	20	20	20	20	20	20	20	20	20	20
59	20	20	20	20	20	20	21	20	21	20
60	20	20	20	20	20	20	20	20	20	20
61	20	20	20	20	20	20	20	20	21	20
62	20	20	20	20	20	20	20	20	20	20
63	20	20	20	20	20	20	20	20	20	20
64	20	20	20	20	20	20	20	20	21	20
65	20	20	20	20	20	20	20	20	21	20
66	20	20	20	20	20	20	20	20	20	20
67	20	20	20	20	20	20	20	20	20	20
68	20	20	20	20	20	20	20	20	20	20
69	20	20	20	20	20	20	20	20	21	20
70	20	20	20	20	20	20	20	20	20	20
71	20	20	20	20	20	20	20	20	20	20
72	20	20	20	20	20	20	21	20	21	20
73	20	20	20	20	20	20	20	20	21	20
74	20	20	20	20	20	20	20	20	21	20
75	20	20	20	20	20	20	21	20	21	20
76	20	20	20	20	20	20	20	20	20	20
77	20	20	20	20	20	20	21	20	21	20
78	20	20	20	20	20	20	20	20	21	20
79	20	20	20	20	20	20	20	20	20	20
80	20	20	20	20	20	20	20	20	20	20
81	20	20	20	20	20	20	20	20	20	20
82	20	20	20	20	20	20	20	20	20	20
83	20	20	20	20	20	20	20	20	21	20
84	20	20	20	20	20	20	20	20	21	20
85	20	20	20	20	20	20	20	20	21	20
86	20	20	20	20	20	20	20	20	20	20
87	20	20	20	20	20	20	20	20	21	20
88	20	20	20	20	20	20	20	20	21	20

Time (min)	tc1 (°C)	tc2 (°C)	tc3 (°C)	tc4 (°C)	tc5 (°C)	Mean (tc1–tc5) (°C)	tc6 (°C)	tc7 (°C)	tc8 (°C)	tc9 (°C)
89	20	20	20	20	20	20	20	20	20	20
90	20	20	20	20	20	20	21	20	21	20
91	20	20	20	20	20	20	20	20	21	20
92	20	20	20	20	20	20	21	20	21	20
93	20	20	20	20	20	20	20	20	20	20
94	20	20	20	20	20	20	21	20	21	20
95	20	20	20	20	20	20	20	20	21	20
96	20	20	20	20	20	20	20	20	21	20
97	20	20	20	20	20	20	20	20	21	20
98	20	20	20	20	20	20	21	20	21	20
99	20	20	20	20	20	20	21	20	21	20
100	20	20	20	20	20	20	20	20	21	20
101	20	20	20	20	20	20	21	20	21	20
102	20	20	20	20	20	20	21	20	21	20
103	20	20	20	20	20	20	21	20	21	21
104	20	20	20	20	20	20	21	20	21	20
105	20	20	20	20	20	20	21	20	21	20
106	20	20	20	20	20	20	21	20	21	20
107	20	20	20	20	20	20	21	20	21	20
108	20	20	20	20	20	20	21	20	21	20
109	20	20	20	20	20	20	21	20	21	20
110	20	20	20	20	20	20	21	21	21	21
111	20	20	20	20	20	20	21	20	21	20
112	20	20	20	20	20	20	21	20	21	20
113	20	20	20	20	20	20	21	20	21	20
114	20	20	20	20	20	20	21	20	21	20
115	20	20	20	20	20	20	21	20	21	20
116	20	20	20	20	20	20	21	20	21	20
117	20	20	20	20	20	20	21	20	21	21
118	20	20	20	20	20	20	21	20	21	21
119	20	20	20	20	20	20	21	20	21	20
120	20	20	20	20	20	20	21	20	21	20
121	20	20	20	20	20	20	21	20	21	20
122	20	20	20	20	20	20	21	20	21	20
123	20	20	20	20	20	20	21	21	21	21
124	20	21	20	21	20	20	21	21	21	21
125	21	21	20	20	20	20	21	21	21	20
126	19	21	21	20	20	20	21	21	21	20
127	22	21	19	19	19	20	20	20	21	21
128	20	20	19	18	22	20	20	21	21	20
129	23	19	19	22	18	20	22	22	20	20
130	19	20	20	21	20	20	22	21	21	21
131	20	20	20	20	19	20	20	20	21	21
132	21	20	20	20	20	20	21	20	21	21
133	20	20	20	20	20	20	21	21	21	21

Time (min)	tc1 (°C)	tc2 (°C)	tc3 (°C)	tc4 (°C)	tc5 (°C)	Mean (tc1–tc5) (°C)	tc6 (°C)	tc7 (°C)	tc8 (°C)	tc9 (°C)
134	20	20	20	20	20	20	21	21	21	21
135	20	20	20	20	20	20	21	21	21	21
136	20	20	20	20	20	20	21	21	21	21
137	20	20	20	20	20	20	21	21	21	21
138	20	20	20	20	20	20	21	21	21	21
139	20	20	20	21	20	20	21	21	21	21
140	20	20	20	20	20	20	21	21	21	21
141	21	21	20	20	20	20	21	21	21	21
142	20	21	20	21	20	20	21	21	21	21
143	21	21	20	20	20	20	21	21	21	21
144	20	21	20	21	20	20	21	21	21	21
145	20	20	20	21	20	20	21	21	21	21
146	20	21	20	21	20	20	21	21	21	21
147	20	20	20	20	20	20	21	21	21	21
148	20	21	20	21	20	20	21	21	21	21
149	21	21	20	21	20	21	21	21	21	21
150	21	21	20	21	20	21	21	21	21	21
151	21	21	20	21	20	21	21	21	21	21
152	21	21	21	21	21	21	22	21	21	21
153	21	21	21	21	20	21	22	21	21	21
154	21	21	21	21	21	21	22	21	22	22
155	21	21	21	21	21	21	22	21	21	21
156	21	21	21	21	21	21	22	21	22	22
157	21	21	21	21	21	21	22	22	22	21
158	21	21	21	21	21	21	22	21	21	22
159	21	21	21	21	21	21	22	22	22	22
160	21	21	21	21	21	21	22	22	22	22
161	21	21	21	21	21	21	22	22	22	22
162	21	21	21	22	21	21	22	22	22	22
163	21	21	21	22	21	21	22	22	22	22
164	21	21	21	22	21	21	22	22	22	22
165	21	21	21	22	21	21	22	22	22	22
166	21	21	21	22	21	21	22	22	22	22
167	22	22	21	22	21	22	22	22	22	22
168	22	22	22	22	21	22	22	22	22	23
169	22	22	22	22	21	22	23	22	22	23
170	22	22	22	22	22	22	23	23	22	23
171	22	22	22	23	22	22	23	22	22	23
172	22	22	22	23	22	22	23	23	23	23
173	22	22	22	23	22	22	23	23	23	23
174	22	22	22	23	22	22	23	23	23	23
175	22	23	22	23	22	22	23	23	23	23
176	22	23	22	23	22	22	23	23	23	23
177	22	23	22	23	22	22	23	23	23	23
178	22	23	23	23	22	23	24	23	23	24

Time (min)	tc1 (°C)	tc2 (°C)	tc3 (°C)	tc4 (°C)	tc5 (°C)	Mean (tc1–tc5) (°C)	tc6 (°C)	tc7 (°C)	tc8 (°C)	tc9 (°C)
179	23	23	23	24	23	23	24	24	24	24
180	23	23	23	24	22	23	24	23	23	24
181	23	23	23	24	23	23	24	24	24	24
182	23	23	23	24	23	23	24	24	24	24
183	23	24	23	24	23	23	24	24	24	24
184	23	24	23	25	23	24	25	24	24	25
185	23	24	24	25	23	24	25	24	24	25
186	24	24	24	25	23	24	25	24	25	25
187	24	24	24	25	24	24	25	25	25	25
188	24	24	24	25	23	24	25	25	25	25
189	24	25	24	26	24	25	26	25	25	25
190	24	25	24	26	24	25	26	25	25	26
191	24	25	25	26	24	25	26	25	25	26
192	25	25	25	26	24	25	26	25	26	26
193	25	25	25	27	25	25	27	26	26	26
194	25	25	25	27	25	25	27	26	26	26
195	25	25	25	27	25	25	27	26	26	27
196	25	26	26	27	25	26	27	26	26	27
197	26	26	26	28	25	26	28	26	27	27
198	26	26	26	28	25	26	28	26	27	27
199	26	27	26	28	26	27	28	27	27	28
200	26	27	26	28	26	27	28	27	27	28
201	26	27	27	29	26	27	29	27	27	28
202	27	27	27	29	26	27	29	27	28	28
203	27	27	27	29	27	27	30	28	28	28
204	27	27	27	29	27	27	30	28	28	28
205	27	28	28	30	27	28	30	28	28	29
206	28	28	28	30	27	28	31	28	29	29
207	28	28	28	30	27	28	31	28	29	29
208	28	28	28	30	28	28	31	28	29	29
209	28	29	29	31	28	29	32	29	30	30
210	28	29	29	31	28	29	32	29	30	30
211	29	29	29	31	28	29	32	29	30	30
212	29	29	29	32	29	30	33	29	30	30
213	29	30	29	32	29	30	33	30	30	31
214	29	30	30	32	29	30	33	30	31	31
215	30	30	30	33	29	30	34	30	31	31
216	30	30	30	33	30	31	34	31	31	31
217	30	31	30	33	30	31	34	31	31	32
218	31	31	31	33	30	31	35	31	32	32
219	31	31	31	34	30	31	35	31	32	32
220	31	31	31	34	31	32	35	31	32	32
221	31	31	31	34	31	32	36	31	32	32
222	32	32	32	35	31	32	36	32	33	33
223	32	32	32	35	31	32	36	32	33	33

Time (min)	tc1 (°C)	tc2 (°C)	tc3 (°C)	tc4 (°C)	tc5 (°C)	Mean (tc1–tc5) (°C)	tc6 (°C)	tc7 (°C)	tc8 (°C)	tc9 (°C)
224	32	32	32	35	32	33	37	32	33	33
225	32	33	32	35	32	33	37	33	33	33
226	33	33	33	36	32	33	37	33	34	34
227	33	33	33	36	32	33	38	33	34	34
228	33	34	33	36	33	34	38	34	35	34
229	33	33	33	37	33	34	38	34	35	34
230	34	34	34	37	33	34	39	34	35	35
231	34	34	34	37	33	34	39	34	35	35
232	34	34	34	37	34	35	39	34	35	35
233	35	35	35	37	34	35	39	35	36	35
234	35	35	34	38	34	35	40	35	36	35
235	35	35	35	38	34	35	40	35	36	35
236	35	35	35	38	35	36	40	36	36	36
237	36	35	35	38	35	36	40	36	37	36
238	36	36	36	39	35	36	41	36	37	36
239	36	36	36	39	35	36	41	36	37	36
240	37	36	36	39	36	37	41	37	37	37

Observations and measured deformations

Time [min:s]	**E/U**	**Observation** (E is fire exposed side, U is unexposed side)
0:00		Test was started.
200:10	U	A minor vertical crack was observed in the middle of an aerated concrete slab on the right side of TC 7.
217:00	U	The above mentioned minor crack was observed to continue up to TC 3.
240:30		Test was terminated

Deflection

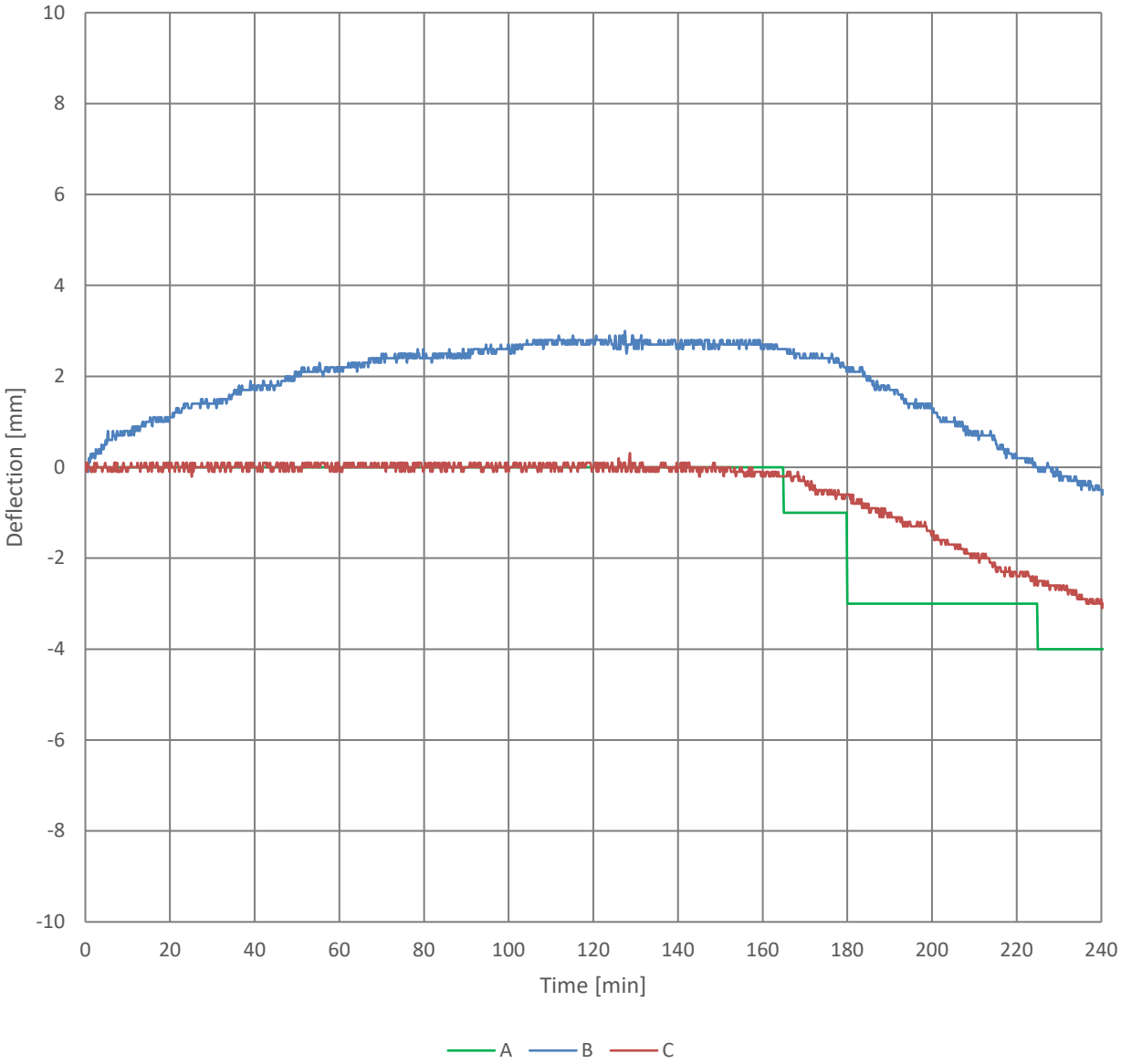


Figure 1. Measured deflections (positive reading is towards the furnace)
(Deflection measuring point A measured manually at 15min intervals)

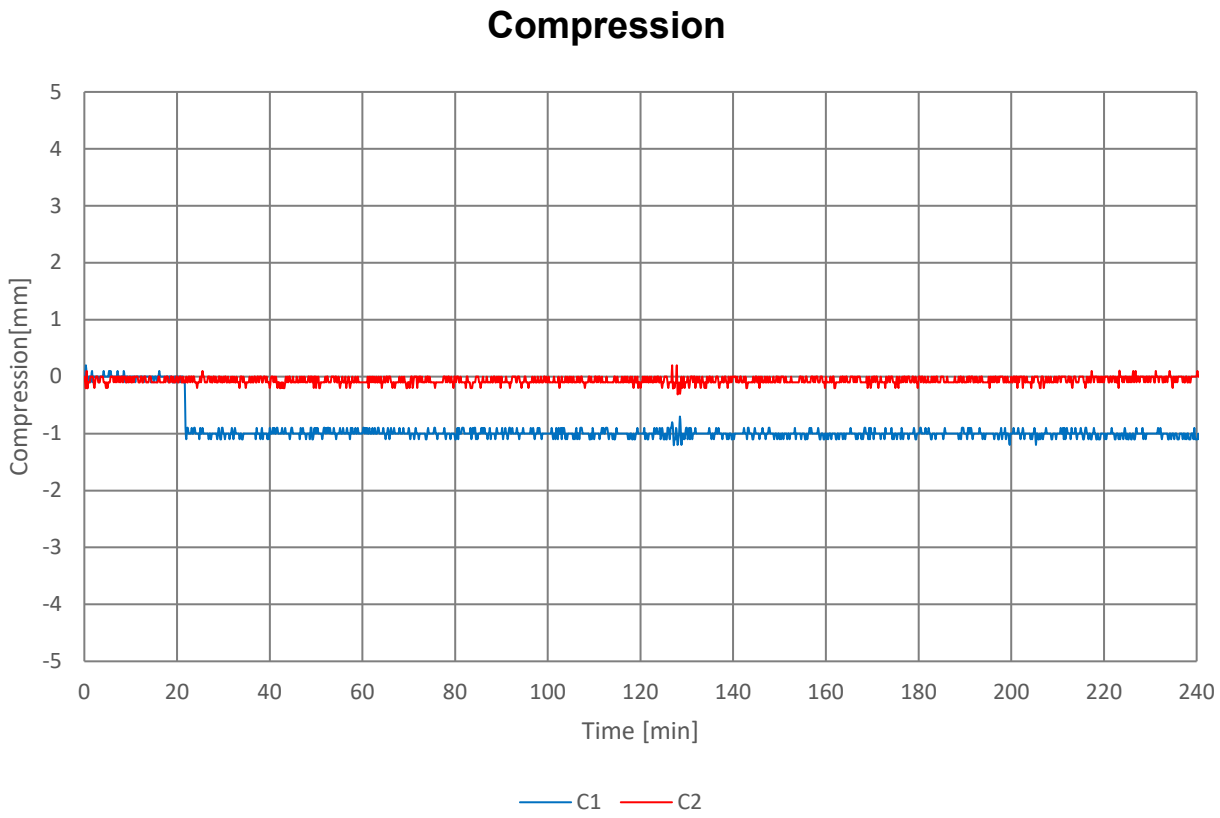


Figure 2. Compression

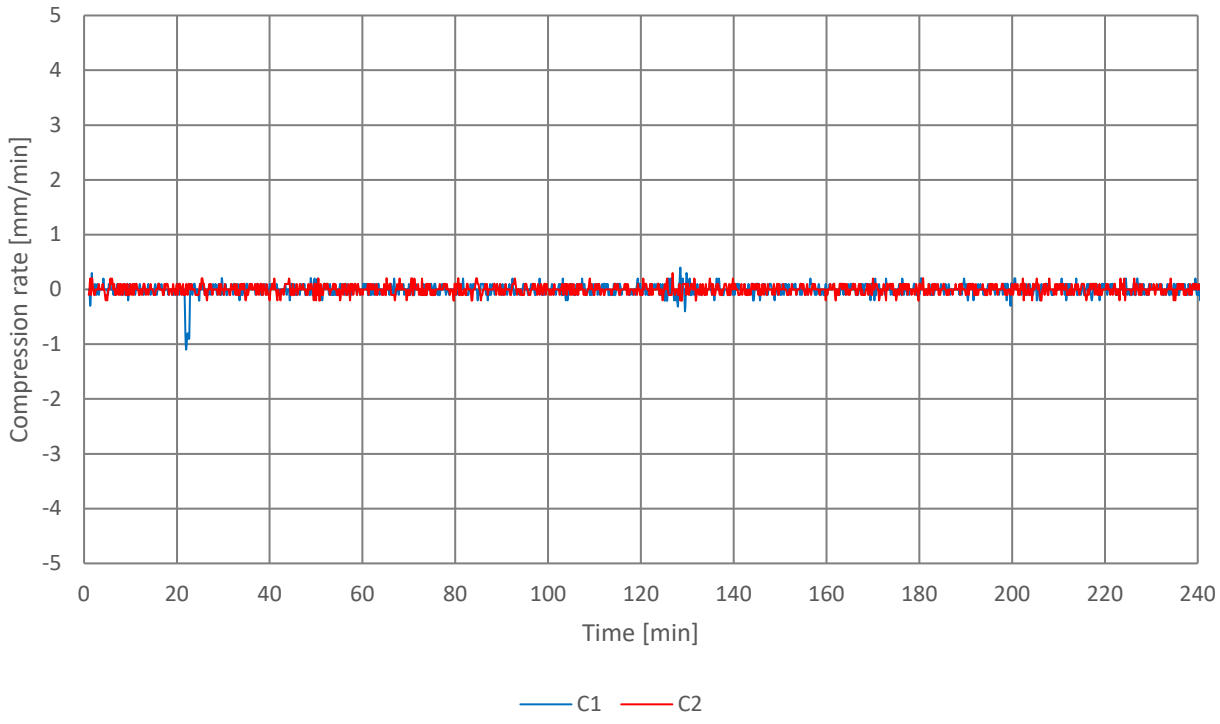


Figure 3. Compression rate

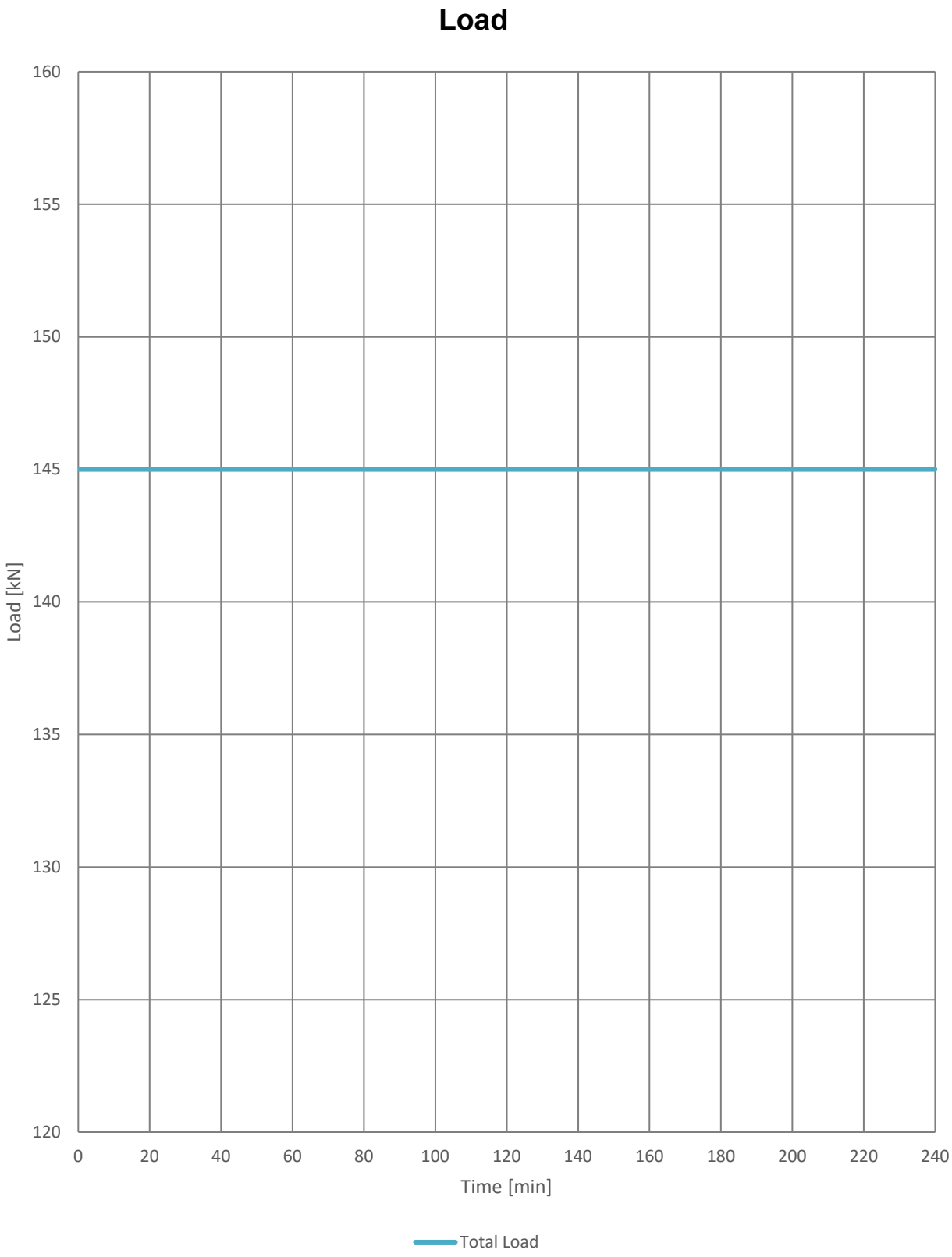


Figure 4. Total load

Photos of the test specimen

Figure 1. Exposed side of the fire test prior to the fire test.

Figure 2. Unexposed side of the fire test prior to the fire test.

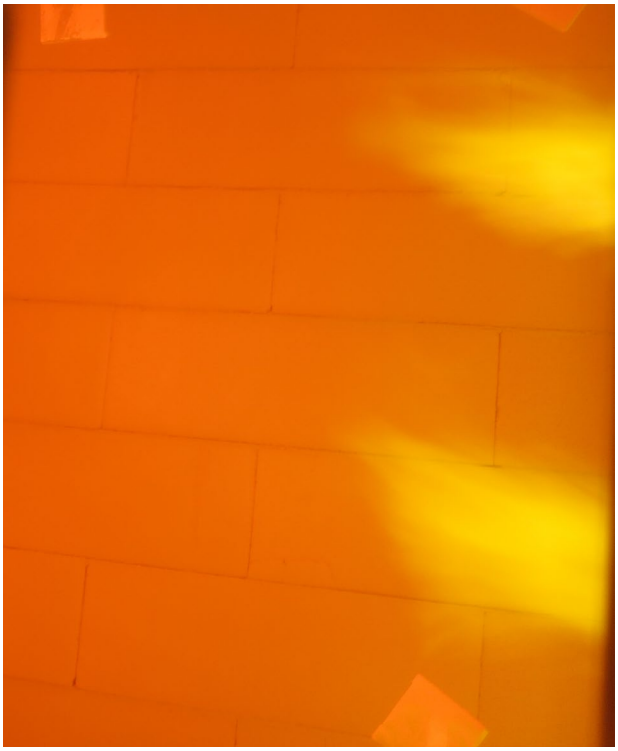


Figure 3. Test time 31 min 30 s. Fire exposed side.

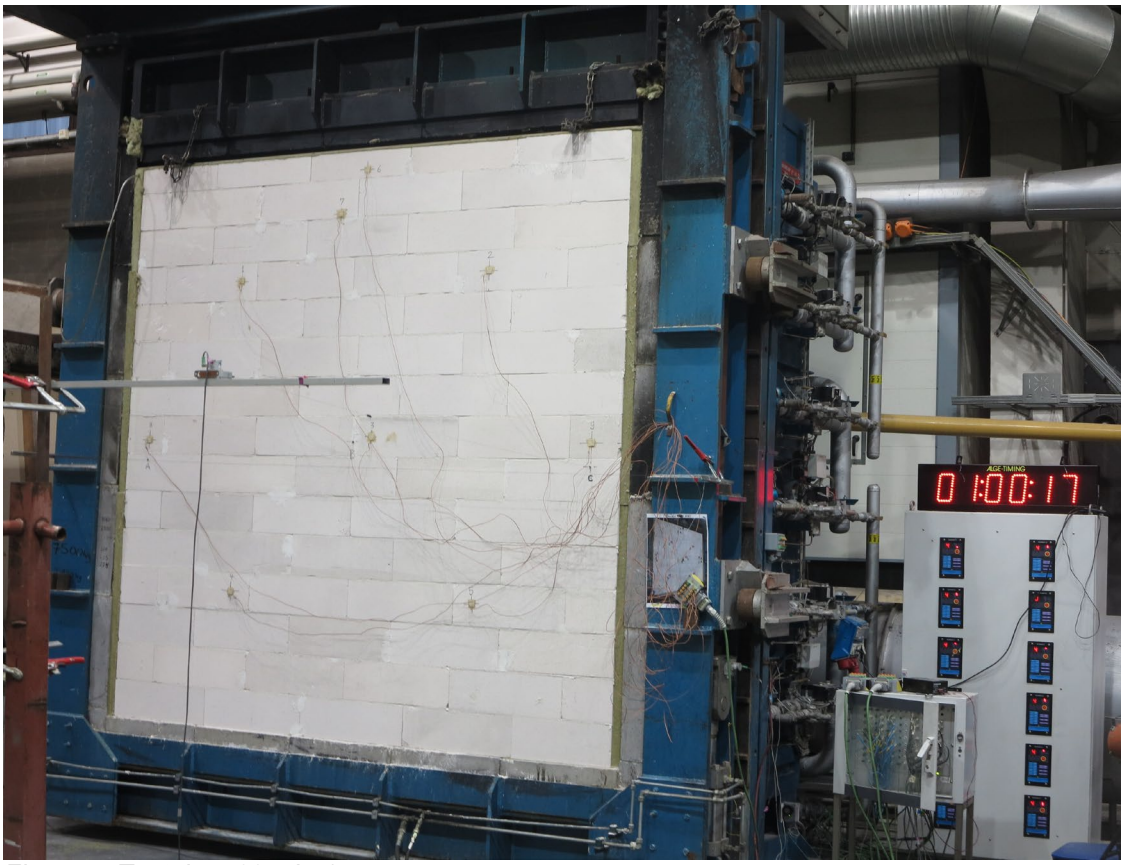


Figure 4. Test time 60 min 17 s.

Figure 5. Test time 120 min 0 s.

Figure 6. Test time 180 min 0 s.

Figure 7. Test time 180 min 18 s, Fire exposed side.

Figure 8. Test time 217 min 40 s.

Figure 9. Test time 240 min 0 s.

Figure 10. Unexposed side of the test specimen, 12 s after the end of fire resistance test.

Figure 11.Fire exposed side of the test specimen after the end of the fire resistance test.

Construction of the test specimen

Test specimen

The test specimen was a loadbearing autoclaved aerated (AAC) concrete block wall construction which consisted of 600 mm wide, 200 mm high and 300 mm deep Bauroc ECOTERM+ autoclaved aerated concrete blocks (nominal density 300 kg/m^3). Bauroc Thin Layer Mortar and two stripes of Murfor Compact A-40 was installed between every 4th horizontal layer of the blocks. Horizontal and vertical gaps between the blocks were filled with Bauroc Thin Layer Mortar.

The size of the specimen was w x h = 2900 mm x 2950 mm and thickness 300 mm.

The client delivered materials for the test specimen on 2 November, 2021.

Verification

Conformity of the test specimen with the drawings was verified during the mounting before the test and during the demolition after the test.

Loading frame

Loadbearing wall construction was mounted to the opening of a loading test frame. The size of the opening was 3060 x 2710 mm. The load was shared with a movable loading beam above the wall so that the wall structure was loaded with a centric line load of 50 kN/m, given by the client, up to the test time of 240 min 30 s.

Mounting of wall

The specimen was mounted into the opening of the testing frame on 4-5 November, 2021 by the client. A steel plate (300 mm x 10 mm, l = 3000 mm) and a square steel rod (16 mm x 16 mm) was placed longitudinally at the top of the specimen under the movable steel beam. The specimen was installed so that the steel rod was centrally above the loadbearing element.

Gaps between the edge studs and the test frame on the both sides of the specimen were filled with rock wool slabs so that the edges were free to bend.

The load of the loading beam was increased gradually so that 15 minutes before the start of the test the full load was achieved.

Conditioning of the test specimen

The materials were not conditioned. Materials were stored in a test hall from the day of delivery until the test day.

Determined material properties

Following material properties were determined from samples taken in connection of the mounting of the test specimen:

Material	Weight per area/volume	Moisture content*) (105 °C)
Bauroc ECOTERM+	319 kg/m^3	3.9 %

*) = moisture content and change of weight are calculated as a percentage of dry weight (equilibrium moisture content of plasterboard in temperature of 50 °C). Values are given as averages of three samples.