

MFPA Leipzig GmbH

Testing, inspection and certification body for
building materials, building products and building systems

Division III - Structural Fire Protection

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**Team 3.2 - Fire Behaviour of Building Types and
Special Structures**

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Test report no. PB 3.2/18-255-1

from 24 May 2019

1st copy

Subject matter: Orienting fire test of loaded type "KK" cable clamps in accordance with DIN EN 1363-1:2012-10 under thermal stress according to the standard time-temperature curve (ETK) to determine the fire resistance period.

Client: Sormat Oy
Harjutie 5
FI-21290 Rusko
Finland

Date of order: 4 March 2019

Date of testing: 12 March 2019

Identification: KK in corresponding size

Person in charge: Dipl.-Ing. S. Bauer

This report consists of 4 pages and 4 enclosures.

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1 Reason and objective

On 4 March 2019, Sormat Oy commissioned MFPA Leipzig GmbH to perform an orienting fire test of mechanically loaded cable clamps type "KK" in accordance with DIN EN 1363-1:2012-10 [1] under thermal stress according to the standard time-temperature curve (TTC) to verify a fire resistance period of 90 minutes.

This test report describes the structural set-up, the test conditions and the results of the fire test from 12 March 2019.

The tests were performed at the Fire Test Centre of MFPA Leipzig GmbH, MFPA-Allee 1, 04209 Laue bei Delitzsch, Germany.

2 Description of the tested constructions

The type "KK" cable clamp is used to clamp cables, hoses and other elongated elements. It consists of a basic body, which can be hung up, and a screwable clamp and is designed for use in the KKKS installation bar, see figure 1. Cable clamp and installation bar are made of galvanized steel (clamp 25 µm, bar 20 µm). The diameter of the cable clamps varies from 12 mm to 82 mm. The number in the name of the individual cable clamp sizes indicates the maximum permissible cable cross-section which can be mounted using this cable clamp.



Figure 1 View of the KK 12 cable clamp and the KKKS installation bar

All sizes, from KK 12 to KK 82, were tested while attached to the KKKS installation bar and loaded with a maximum central load which was defined by the client. For details and photos of the clamps, please refer to enclosures 1 and 4.

3 Set-up and performance of the test

The reinforced concrete ceiling section to which the installation bars were attached using metal anchors formed the upper horizontal space enclosure of the fire chamber during the fire test. After 28 days, the concrete section could be assigned to compressive strength class C 20/25. The positions of the samples in the test furnace are shown in enclosure 2.

The cable clamps were loaded by suspending dead loads. The clamps were subjected to central tension and thermal load from all sides. In this way, the fire resistance period was determined. The fire tests were performed in accordance with DIN EN 1363-1:2012-10 [1], using the standard temperature-time curve (TTC).

To verify the temperatures in the fire area, four plate thermometers in accordance with DIN EN 1363-1:2012-10 [1], section 4.5.1.1, were installed in the fire chamber at a distance of 150 ± 50 mm to the reinforced concrete ceiling to control the fire area temperature. All fire area temperatures were measured and recorded at intervals of 5 seconds. The temperatures which were measured in the fire chamber during the fire test are graphically analysed in enclosure 3.

4 Test results and analysis

The results of the orienting fire test are listed in table 1 below including the cause of failure. The test duration was 93 minutes.

Table 1 Results of the orienting test of the loaded cable clamps

Number	Size	Suspended load [kg]	Time of failure [min:s]	Cause of failure
1.1	KK 12	1.0	93:00	No failure during the test
1.2	KK 34	2.0	93:00	No failure during the test
1.3	KK 12	1.0	93:00	No failure during the test
1.4	KK 34	2.0	93:00	No failure during the test
2.1	KK 40	3.0	93:00	No failure during the test
2.2	KK 14	1.0	93:00	No failure during the test
2.3	KK 40	3.0	93:00	No failure during the test
2.4	KK 14	1.0	93:00	No failure during the test
3.1	KK 18	1.0	93:00	No failure during the test
3.2	KK 46	3.0	93:00	No failure during the test
3.3	KK 18	1.0	93:00	No failure during the test
3.4	KK 46	3.0	93:00	No failure during the test
4.1	KK 52	3.0	93:00	No failure during the test
4.2	KK 22	1.0	93:00	No failure during the test
4.3	KK 52	3.0	93:00	No failure during the test
4.4	KK 22	1.0	93:00	No failure during the test
5.1	KK 26	1.0	93:00	No failure during the test
5.2	KK 60	3.0	93:00	No failure during the test
5.3	KK 26	1.0	93:00	No failure during the test
5.4	KK 60	3.0	93:00	No failure during the test
6.1	KK 82	3.0	93:00	No failure during the test
6.2	KK 30	2.0	93:00	No failure during the test
6.3	KK 82	3.0	93:00	No failure during the test
6.4	KK 30	2.0	93:00	No failure during the test



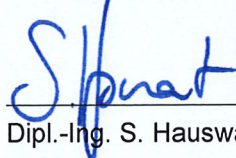
The orienting fire test showed that the cable clamps with the relevant corresponding central loads, see table 1, did not fail under the influence of thermal stress according to the standard time-temperature curve (TTC). This means that the type "KK" cable clamps with the sizes and loads which are shown in table 2 have a fire resistance period above 90 minutes.

Table 2 Fire resistance period with corresponding central load

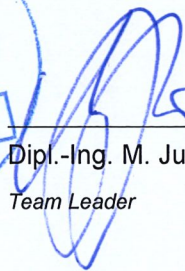
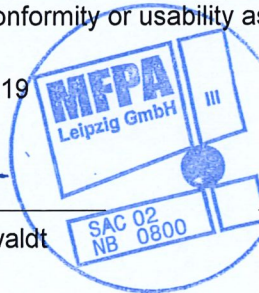
Type	central load	Fire resistance period
KK 12	1 kg	90 minutes
KK 14	1 kg	
KK 18	1 kg	
KK 22	1 kg	
KK 26	1 kg	
KK 30	2 kg	
KK 34	2 kg	
KK 40	3 kg	
KK 46	3 kg	
KK 52	3 kg	
KK 60	3 kg	
KK 82	3 kg	

The results of the tests refer exclusively to the test items described herein. This document does not replace any certificate of conformity or usability as defined by the building regulations (national/European).

Leipzig, 24 May 2019



Dipl.-Ing. S. Hauswaldt
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Enclosures

- Enclosure 1 Parameters of the type "KK" cable clamp
- Enclosure 2 Structural design of the testing device and installation situation
- Enclosure 3 Measured values
- Enclosure 4 Photo documentation of the fire test

Corresponding documents

- [1] DIN EN 1363-1:2012-10 Fire resistance tests - Part 1: General Requirements

Enclosure 1 Parameters of the type "KK" cable clamp

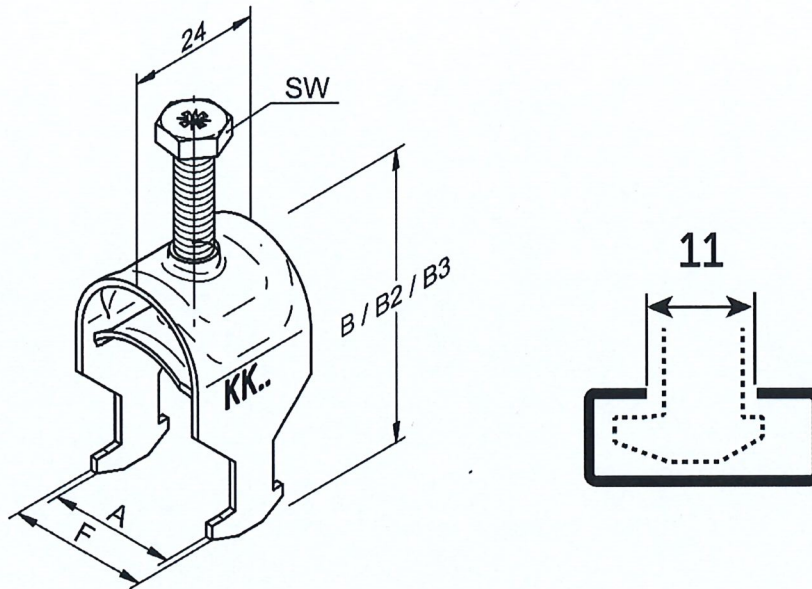


Figure A1.1 Detailed drawing of the cable clamp

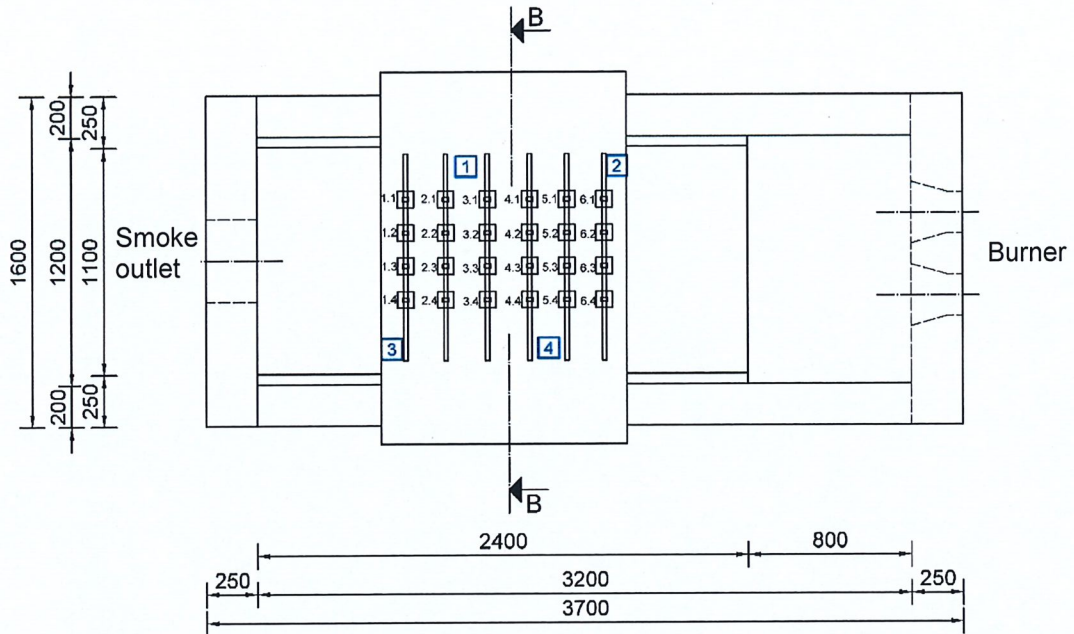
Table A1.2 Parameters of the cable clamp


KK/KP KL/KR	A	F _{max}	KK	KK/2	KK/3
			B	B2	B3
12	14	18	38	53	65
14	15	19	38	54	65
18	19	23	44	56	75
22	23	27	43	65	90
26	27	31	52	77	105
30	31	35	60	85	120
34	35	39	59		
40	41	45	76	118	
46	47	51	84		
52	53	57	96		
60	62	66	105		
82	83	87	123		



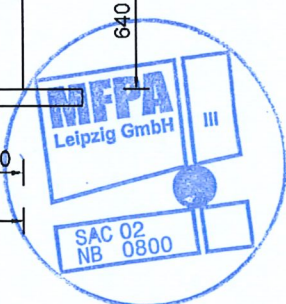
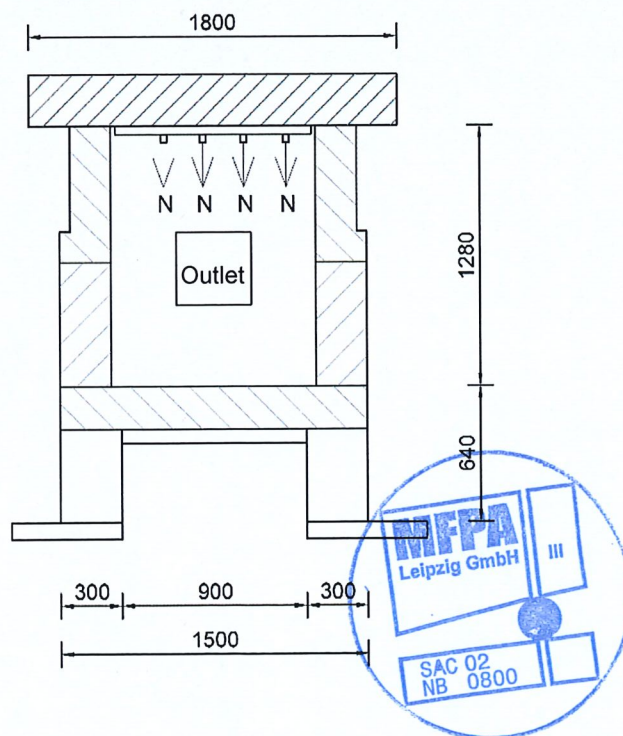
Provided by the client.

Enclosure 2 Structural design of the testing device and installation situation



 Furnace thermal element

Section B-B



Enclosure 3 Measured values

Diagram A3.1 Temperatures in the fire area

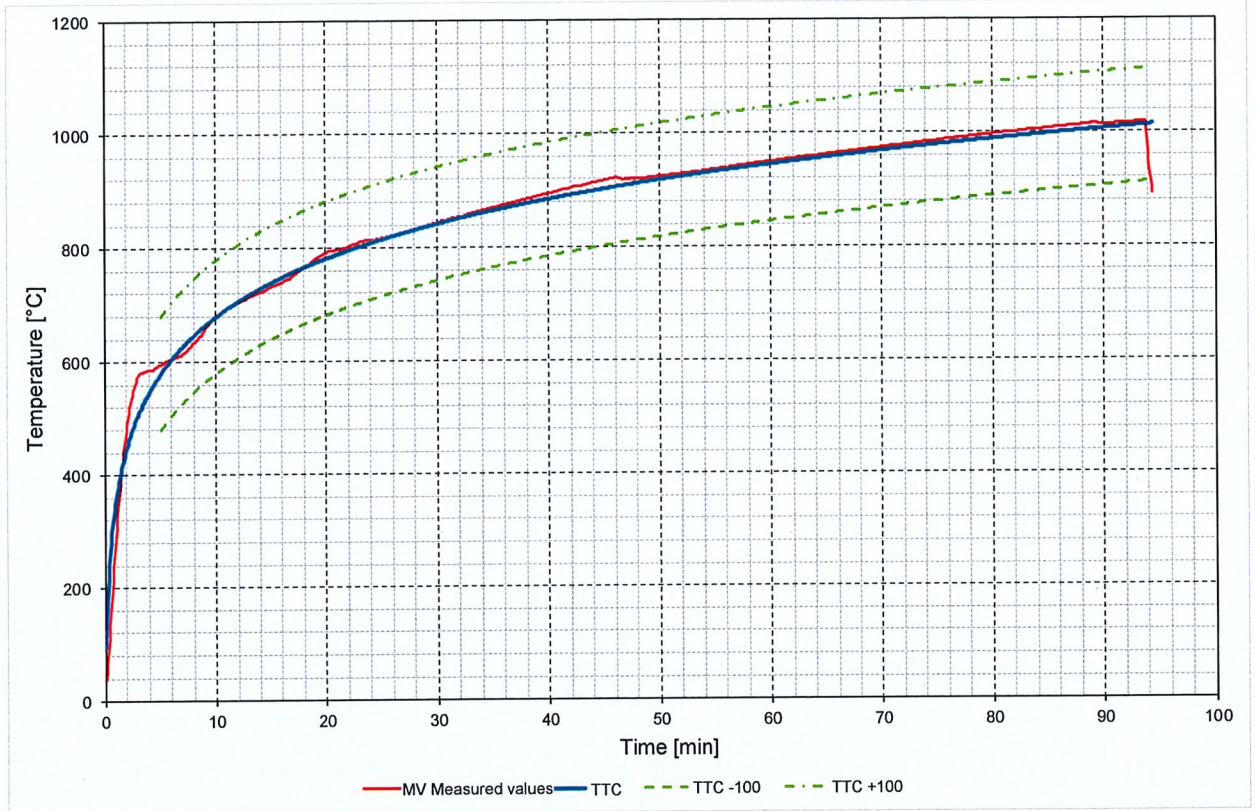


Diagram A3.2 Deviation from the integral of the standard temperature-time curve (TTC)

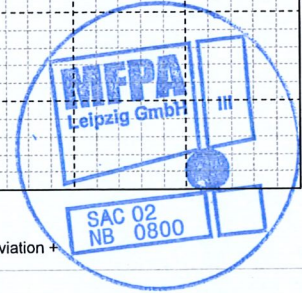
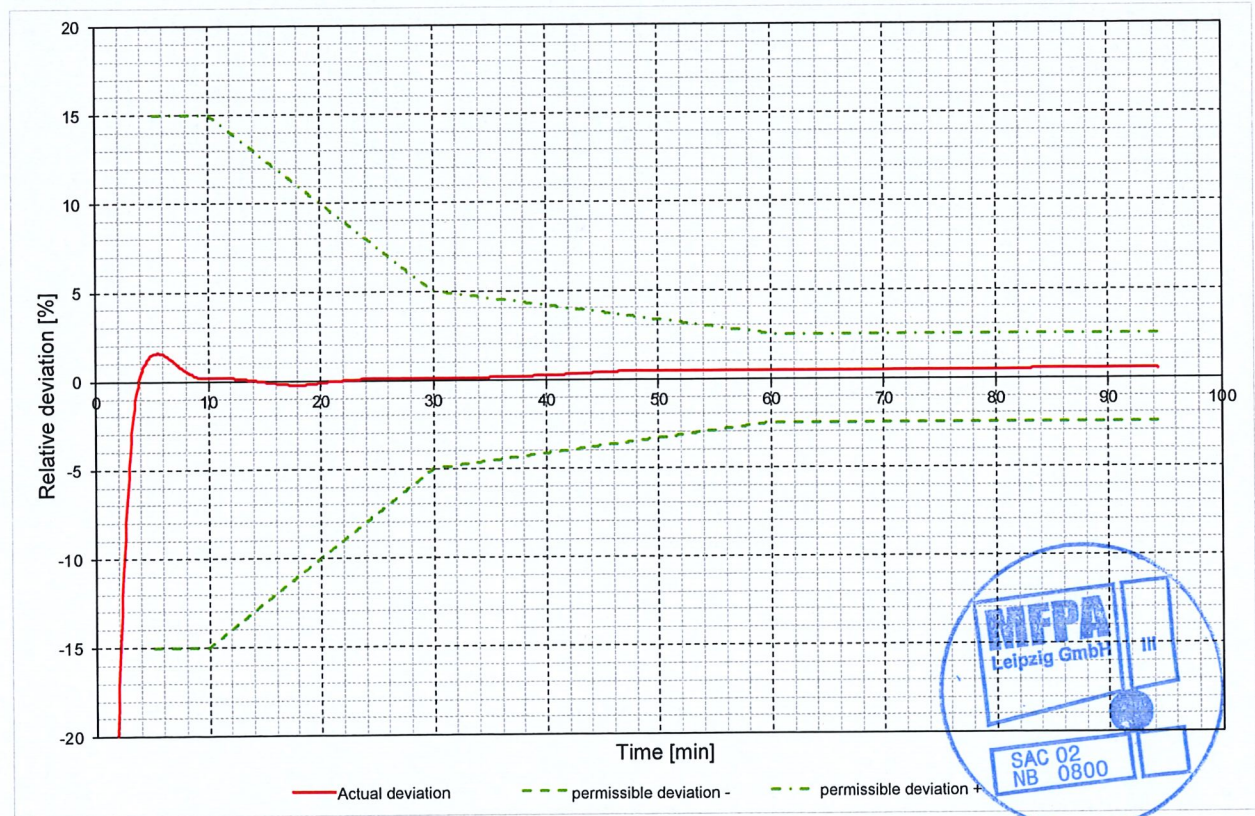
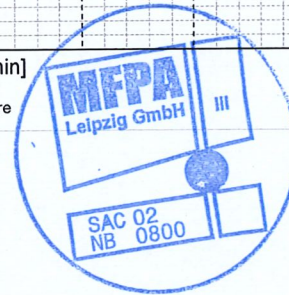
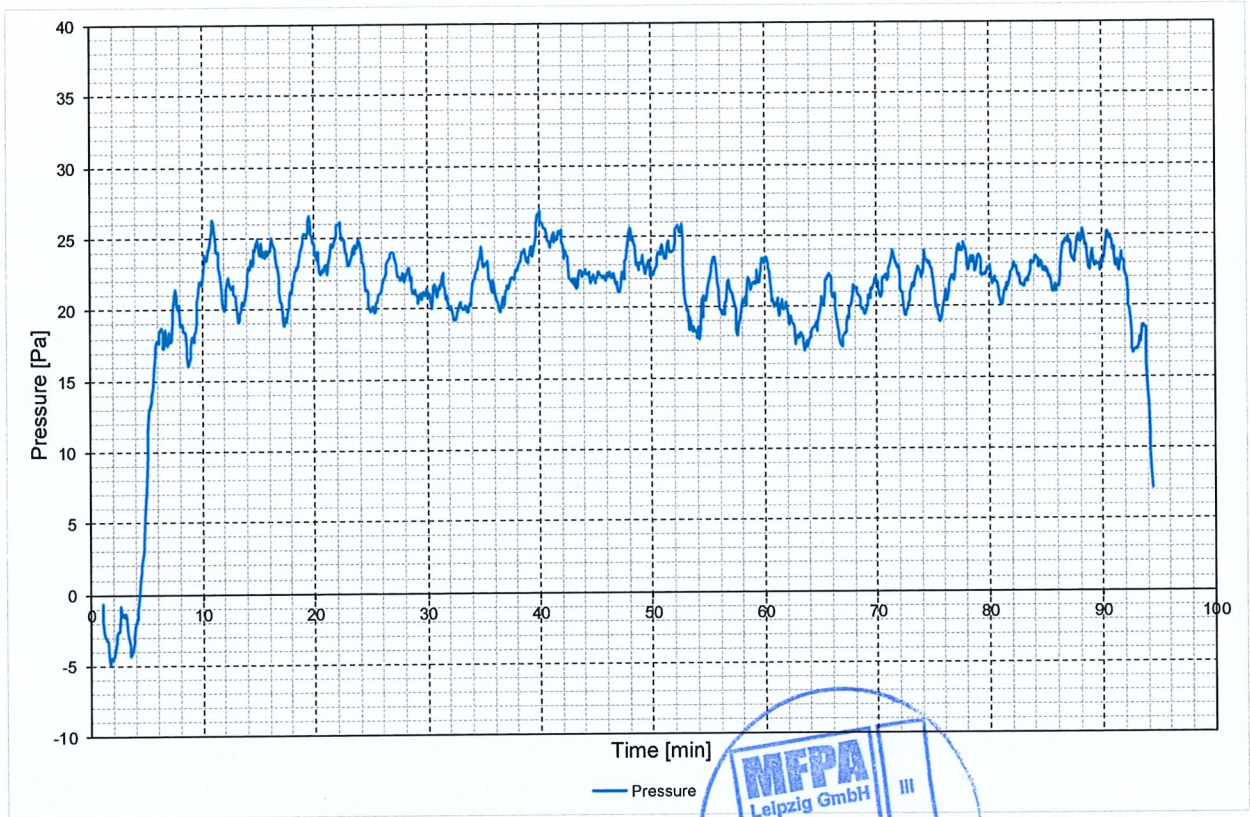




Diagram A3.3 Pressure in fire area



Enclosure 4 Photo documentation of the fire test



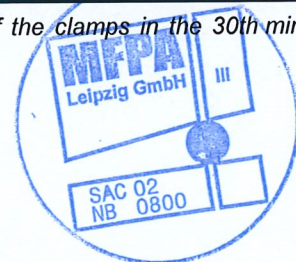
Figure A4.1 View of the test set-up.



Figure A4.2 View of the clamps in the 10th minute of test.



Figure A4.3 View of the clamps in the 30th minute of test.



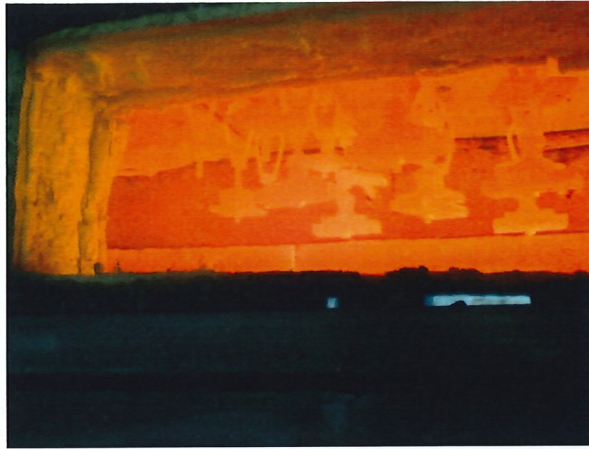


Figure A4.4 View of the clamps in the 60th minute of test.



Figure A4.5 View of the clamps in the 75th minute of test.

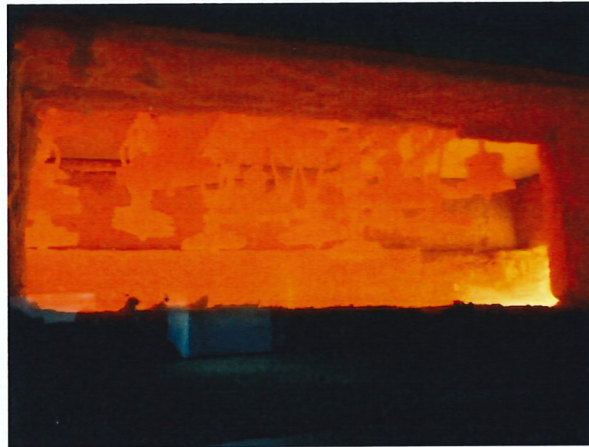


Figure A4.6 View of the clamps in the 90th minute of test.



Figure A4.7 View of the clamps after the fire test.

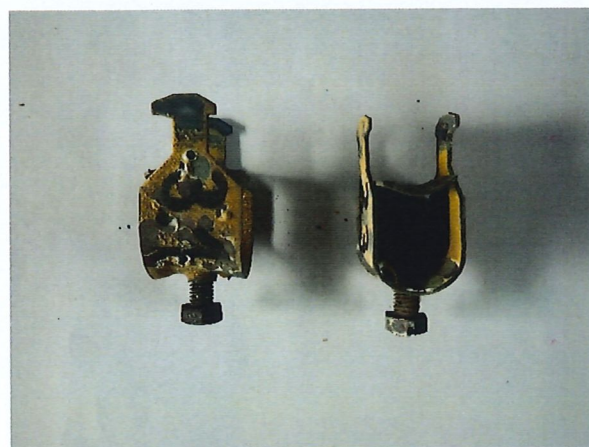


Figure A4.8 View of a cable clamp after the fire test.



Figure A4.9 View of the installation bars after the fire test.

