Test report No. RRF - NS 17 6134

Of the Wood heater

Sargas 1

Sargas 3

of the manufacturer

Schiedel GmbH

Friedrich-Schiedel-Str. 2-6, At-4542 Nußbach

Rhein-Ruhr Feuerstätten Prüfstelle • Im Lipperfeld 34 b • 46047 Oberhausen
- ❖ Testing laboratory according to Regulation (EU) Nr. 305/2011, notified body No.: NB 1625
- ❖ Testing laboratory according to DIN EN ISO/IEC 17025:2005, DAkkS No. D-PL-17727-01-00
- ❖ Testing, monitoring and certification body according to LBO, registered No.: NRW 15
- ❖ Testing, monitoring and certification body in construction supervision licensing procedures
- ❖ DIN CERTCO testing laboratory, registered No. PL139

RRF Rhein-Ruhr Feuerstätten Prüfstelle

DAkkS Deutsche Akkreditierungsstelle D-PL-17727-01-00

Test report: Enclosed wood heater – smoke emission

Test methods	**Norsk Standards:** NS 3058-1: June 1994 NS 3058-2: June 1994 NS 3059: October 1994
Testing station	**RRF** Rhein-Ruhr Feuerstätten Prüfstelle GmbH Im Lipperfeld 34 b, 46047 Oberhausen, DEUTSCHLAND Telefon: +49(0)208-607041 - 0, Fax: +49(0)208-607041 - 28
Reference No.	**RRF - NS 17 6134**
Manufacturer	**Schiedel GmbH** Friedrich-Schiedel-Str. 2-6, At-4542 Nußbach
Product name Type, Serial number Variant/s of the product family	Wood heater **Sargas 1** **Sargas 3**
Client	**Schiedel GmbH** Friedrich-Schiedel-Str. 2-6, At-4542 Nußbach
Date of delivery	26.06.2017
Taking of the appliance	Delivered by manufacturer
Wood heater grade	2
Leckage of the wood heater (at +25 Pa)	13 m^3/h
Total weighted particulate emission	5,14 g/kg dried wood (Max. allowable 10 g/kg)
Maximum emission for one test	9,09 g/kg dried wood (Max. allowable 20 g/kg)
Test location	Im Lipperfeld 34 b, 46047 Oberhausen
Technician	Schulte, K.

Abstract:

The wood heater Sargas 3 and Sargas 1 fulfils the Norwegian requirements for smoke emission according to NS 3059 and the requirements according to EN 13240 approved in the testing laboratory Rhein-Ruhr Feuerstätten Prüfstelle, test report No. RRF - 40 22 6134, dated on 13.04.2022

The test report consisting of pages 1 to 28. The appended test documentation a to e of test report Nr. RRF - 40 22 6134 is valid.

Oberhausen, 13 April 2022
(place and date)

(C. Droll)
(stamp and signature of Deputy Head of Testing Laboratory)

Operation

The Rhein-Ruhr Feuerstätten Prüfstelle GmbH was commissioned to carry out an administrative approval test for smoke emission according to NS3058 / NS3059 using value tables and documents for the product description (e.g. type test report andestedtechnical drawings). The test is based on the test report no. RRF - NS 17 4674 of the tested roomheater Kokra 3S, Kokra from June 16, 2021 by Creina d.d. Kranj, Mirka Vadnova 8, SL-4000 crane. The results of the physical test were taken from the aforementioned test report.

According to the manufacturer, the maximum filling height in the combustion chamber is limited at a height of 270 mm.

Description of the test object

The roomheater Sargas 1 is an appliance for intermittent burning.

The corpus of the roomheater is made of sheet steel with:
- dimensions 1130 x 510 x 425 mm (h x w x d)
- a mass of 100 kg according to the manufacturer
- encasement of sheet steel with rectangular base
- flue gas spigot with a nominal diameter of 150 mm optionally on top or rear side of the appliance
- closed fuel storage below the combustion chamber
- straight, self-closing combustion chamber door made of sheet steel with an inspection window in the front, single-leaf, horizontally raisable
    - interpretation: the installation in a shared flue system according to the current version of DIN 18896 is permitted
- one hand regulator in the front below the combustion chamber door, that
    - regulates the secondary air and enters the combustion chamber via the inspection window and rear openings (2 holes of Ø 7 mm each)
    - can be opened further via a mechanism (upward pressure releases further opening path), whereby additional primary air enters the combustion chamber through the grate
- convection air channel in the rear and side wall of the corpus of the roomheater with a
    - not lockable convection air inlet port below the side inspection windows and the rear wall,an in the fuel storage compartment
    - not lockable convection air outlet port in the top plate
- rear wall and side walls of the combustion chamber made vermiculite
- base of the combustion chamber made of steel with slotted holes in the bottom of the combustion chamber as a grate, designed as a flat firing system
- sheet steel raised towards the front of the combustion chamber door to keep the fuel in the combustion chamber
- baffle made of vermiculite
- flue gas baffle made of sheet steel
- ash pan behind the combustion chamber door
- double radiation protection shield in the fuel storage in a distance of 50 mm to the ash pan insert, also a distance of 50 mm between the radiation protection shields
- radiation protection shield on the rear and side walls between the corpus and the encasement
- Air - exhaust system (LAS) above the fireplace, consisting of
    - a double-walled connecting piece with a length of 1500 mm
    - nominal inner pipe diameter: 150 mm
    - nominal outer pipe diameter: 250 mm
    - insulation made of mineral wool with a thickness of 30 mm flush with the inner pipe
    - circumferential annular gap with a width of 20 mm between insulation and outer pipe, as well as opening on the upper side for combustion air supply

Description of the variant of the product family

The roomheater Sargas 3 is an appliance for intermittent burning.

- The corpus of the roomheater is made of sheet steel with:
- dimensions 1130 x 510 x 425 mm (h x w x d)
- a mass of 100 kg according to the manufacturer
- encasement of sheet steel with rectangular base
- flue gas spigot with a nominal diameter of 150 mm optionally on top or rear side of the appliance
- closed fuel storage below the combustion chamber
- straight, self-closing combustion chamber door made of sheet steel with an inspection window in the front, single-leaf, horizontally raisable
    - interpretation: the installation in a shared flue system according to the current version of DIN 18896 is permitted
- straight lateral inspection windows, double-leaf
- one hand regulator in the front below the combustion chamber door, that
    - regulates the secondary air and enters the combustion chamber via the inspection window and rear openings (2 holes of Ø 7 mm each)
    - can be opened further via a mechanism (upward pressure releases further opening path), whereby additional primary air enters the combustion chamber through the grate
- convection air channel in the rear and side wall of the corpus of the roomheater with a
    - not lockable convection air inlet port below the side inspection windows and the rear wall,an in the fuel storage compartment
    - not lockable convection air outlet port in the top plate
- rear wall and parts of the side walls of the combustion chamber made vermiculite
- base of the combustion chamber made of steel with slotted holes in the bottom of the combustion chamber as a grate, designed as a flat firing system
- sheet steel raised towards the front of the combustion chamber door to keep the fuel in the combustion chamber
- baffle made of vermiculite
- flue gas baffle made of sheet steel
- ash pan behind the combustion chamber door
- double radiation protection shield in the fuel storage in a distance of 50 mm to the ash pan insert, also a distance of 50 mm between the radiation protection shields
- radiation protection shield on the rear wall between the corpus and the encasement
- Air - exhaust system (LAS) above the fireplace, consisting of
    - a double-walled connecting piece with a length of 1500 mm
    - nominal inner pipe diameter: 150 mm
    - nominal outer pipe diameter: 250 mm
    - insulation made of mineral wool with a thickness of 30 mm flush with the inner pipe
    - circumferential annular gap with a width of 20 mm between insulation and outer pipe, as well as opening on the upper side for combustion air supply

Result of the administrative approval

The result of the administrative approval based on technical drawings showed that the roomheater Sargas 1 corresponds to the roomheater Kokra and that the roomheater Sargas 3 corresponds to the roomheater Kokra 3S in terms of its structural and material-specific properties and meets the requirements of Chapter 9.2.

RRF
Rhein-Ruhr Feuerstätten Prüfstelle

Comments

This test report refers to the test of the aforementioned fireplace/s. Other fireplaces, possibly listed in the attachments of this test report, were not part of the testing order.

The provided documents and attachments were checked for completeness regarding the correspondent points of the aforementioned standard. Indications of test results, minimum distance and measurement result are to be transferred from the test report.

A test on non-combustible components with a defined heat thermal resistance was not subject of the testing order.

Measurements fireplace

Parameter	Unit	Requirement according to NS 3058	Value	Requirement fulfilled
Catalyst-stove		1:4.1.1	no	yes
Description of burning chamber				
Height	mm	1:4.2.1	270	yes
Width	mm	1:4.2.2	345	yes
Length	mm	1:4.2.3	220	yes
Chamber volume	m^3	1:4.2	0,0205	yes

Measurements for category 1

Parameter	Unit	Requirement according to NS 3058	Value	Requirement fulfilled
Date	DD.MM.YY		28.09.17	
Atmospheric pressure	mbar	1:4.1.2	1022	yes
Ambient temperature: start testing	°C	1:4.1.2	25	yes
Ambient temperature: end testing	°C	1:4.1.2	26	yes
Air humidity range during test	%	1:4.1.2	47	yes
Air flow range 600 mm from stove (< 0,25 m/s)	m/s	1:4.1.2	<0,25	yes
Volume of gas sample measured by dry gas meter	dm^3	2:6.1	1714	yes
Total amount of particulate matter collected	mg	2:6.1	19	yes
Test run time	min	1:6.3	92	yes
Size of fuel	cm	1:4.3.1	30	yes
Mass of fuel	kg	1:4.3	2,36	yes
Mass of water content	kg	1:4.2	0,45	yes
Dried fuel mass	kg	1:5.1	1,91	yes
Burn rate	kg/h	2:5.4.3	1,25	yes
Leak-check: start testing	m^3/h	1:6.3	0,02	---
The wood heater Kokra 3S fulfils the Norwegian requirements for smoke emission	m^3/h	1:6.3	0,02	---
Leak-check result (≤ 5 %)	%	1:6.3	0,0	yes
Valve openings/settings during tests		1:6.3	2 min open, then 50 mm open	yes

Calculations for category 1

Parameter	Unit	Requirement according to NS 3058	Value	Requirement fulfilled
Volume of gas sample measured corrected to standard conditions	dm^3	1:6.1	1579	yes
Average dry gas meter temperature during the measuring period	°C	1:6.1	26	yes
Particulate concentration	g/dm^3	2:6.3	1,20329E-05	yes
Particulate emission rate	g/h	2:6.4	3,74	yes
Particulate emission rate adjusted to reported emission	g/h	2:6.4	5,44	yes

Proportional rate variation intervals (PRi) for category 1

Proportional rate variation for interval over 10 min:	Requirement according to NS 3058	PRi / %	Requirement fulfilled
10	2:6.6	99,76	yes
20	2:6.6	99,52	yes
30	2:6.6	98,73	yes
40	2:6.6	98,32	yes
50	2:6.6	99,63	yes
60	2:6.6	99,70	yes
70	2:6.6	99,21	yes
80	2:6.6	98,94	yes
90	2:6.6	99,85	yes

Proportional rate variation evaluation for category 1

Proportional rate variation for interval over 10 min:	Requirement according to NS 3058	PRi / %	Requirement fulfilled
PRi for 90% included in [90 %, 110 %]	2:6.6	100	yes
PRi for 0% excluded of [80 %, 120 %]	2:6.6	100	yes

Measurements for category 2

Parameter	Unit	Requirement according to NS 3058	Value	Requirement fulfilled
Date	DD.MM.YY		27.09.17	
Atmospheric pressure	mbar	1:4.1.2	1022	yes
Ambient temperature: start testing	°C	1:4.1.2	26	yes
Ambient temperature: end testing	°C	1:4.1.2	26	yes
Air humidity range during test	%	1:4.1.2	45	yes
Air flow range 600 mm from stove (< 0,25 m/s)	m/s	1:4.1.2	<0,25	yes
Volume of gas sample measured by dry gas meter	dm^3	2:6.1	1246	yes
Total amount of particulate matter collected	mg	2:6.1	8	yes
Test run time	min	1:6.3	65	yes
Size of fuel	cm	1:4.3.1	30	yes
Mass of fuel	kg	1:4.3	2,17	yes
Mass of water content	kg	1:4.2	0,36	yes
Dried fuel mass	kg	1:5.1	1,81	yes
Burn rate	kg/h	2:5.4.3	1,67	yes
Leak-check: start testing	m^3/h	1:6.3	0,03	---
Leak-check: end testing	m^3/h	1:6.3	0,03	---
Leak-check result (≤ 5 %)	%	1:6.3	0,0	yes
Valve openings/settings during tests		1:6.3	2 min open, then 90 mm open	yes

Calculations for category 2

Parameter	Unit	Requirement according to NS 3058	Value	Requirement fulfilled
Volume of gas sample measured corrected to standard conditions	dm^3	1:6.1	1146	yes
Average dry gas meter temperature during the measuring period	°C	1:6.1	27	yes
Particulate concentration	g/dm^3	2:6.3	7,4171E-06	yes
Particulate emission rate	g/h	2:6.4	2,36	yes
Particulate emission rate adjusted to reported emission	g/h	2:6.4	3,72	yes

Proportional rate variation intervals (PRi) for category 2

Proportional rate variation for interval over 10 min:	Requirement according to NS 3058	PRi / %	Requirement fulfilled
10	2:6.6	98,67	yes
20	2:6.6	99,06	yes
30	2:6.6	99,76	yes
40	2:6.6	99,69	yes
50	2:6.6	99,12	yes
60	2:6.6	98,74	yes

Proportional rate variation evaluation for category 2

Proportional rate variation for interval over 10 min:	Requirement according to NS 3058	PRi / %	Requirement fulfilled
PRi for 90% included in [90 %, 110 %]	2:6.6	100	yes
PRi for 0% excluded of [80 %, 120 %]	2:6.6	100	yes

RRF
Rhein-Ruhr Feuerstätten Prüfstelle

Measurements for category 3

Parameter	Unit	Requirement according to NS 3058	Value	Requirement fulfilled
Date	DD.MM.YY		27.09.17	
Atmospheric pressure	mbar	1:4.1.2	1023	yes
Ambient temperature: start testing	°C	1:4.1.2	25	yes
Ambient temperature: end testing	°C	1:4.1.2	26	yes
Air humidity range during test	%	1:4.1.2	46,4	yes
Air flow range 600 mm from stove (< 0,25 m/s)	m/s	1:4.1.2	<0,25	yes
Volume of gas sample measured by dry gas meter	dm^3	2:6.1	1078	yes
Total amount of particulate matter collected	mg	2:6.1	50	yes
Test run time	min	1:6.3	56	yes
Size of fuel	cm	1:4.3.1	30	yes
Mass of fuel	kg	1:4.3	2,23	yes
Mass of water content	kg	1:4.2	0,36	yes
Dried fuel mass	kg	1:5.1	1,87	yes
Burn rate	kg/h	2:5.4.3	2,00	yes
Leak-check: start testing	m^3/h	1:6.3	0,03	---
Leak-check: end testing	m^3/h	1:6.3	0,03	---
Leak-check result (≤ 5 %)	%	1:6.3	0,0	yes
Valve openings/settings during tests		1:6.3	135mm open	yes

Calculations for category 3

Parameter	Unit	Requirement according to NS 3058	Value	Requirement fulfilled
Volume of gas sample measured corrected to standard conditions	dm^3	1:6.1	997	yes
Average dry gas meter temperature during the measuring period	°C	1:6.1	25	yes
Particulate concentration	g/dm^3	2:6.3	5,00502E-05	yes
Particulate emission rate	g/h	2:6.4	16,00	yes
Particulate emission rate adjusted to reported emission	g/h	2:6.4	18,18	yes

Rhein-Ruhr Feuerstätten Prüfstelle RRF

Proportional rate variation intervals (PRi) for category 3

Proportional rate variation for interval over 10 min:	Requirement according to NS 3058	PRi / %	Requirement fulfilled
10	2:6.6	98,38	yes
20	2:6.6	98,43	yes
30	2:6.6	98,50	yes
40	2:6.6	98,93	yes
50	2:6.6	98,77	yes

Proportional rate variation evaluation for category 3

Proportional rate variation for interval over 10 min:	Requirement according to NS 3058	PRi / %	Requirement fulfilled
PRi for 90% included in [90 %, 110 %]	2:6.6	100	yes
PRi for 0% excluded of [80 %, 120 %]	2:6.6	100	yes

RRF
Rhein-Ruhr Feuerstätten Prüfstelle

Measurements for category 4

Parameter	Unit	Requirement according to NS 3058	Value	Requirement fulfilled
Date	DD.MM.YY		28.09.17	
Atmospheric pressure	mbar	1:4.1.2	1022	yes
Ambient temperature: start testing	°C	1:4.1.2	28	yes
Ambient temperature: end testing	°C	1:4.1.2	28	yes
Air humidity range during test	%	1:4.1.2	44	yes
Air flow range 600 mm from stove (< 0,25 m/s)	m/s	1:4.1.2	<0,25	yes
Volume of gas sample measured by dry gas meter	dm^3	2:6.1	737	yes
Total amount of particulate matter collected	mg	2:6.1	40	yes
Test run time	min	1:6.3	41	yes
Size of fuel	cm	1:4.3.1	30	yes
Mass of fuel	kg	1:4.3	2,42	yes
Mass of water content	kg	1:4.2	0,40	yes
Dried fuel mass	kg	1:5.1	2,02	yes
Burn rate	kg/h	2:5.4.3	2,96	yes
Leak-check: start testing	m^3/h	1:6.3	0,03	---
Leak-check: end testing	m^3/h	1:6.3	0,03	---
Leak-check result (≤ 5 %)	%	1:6.3	0,0	yes
Valve openings/settings during tests		1:6.3	open	yes

Calculations for category 4

Parameter	Unit	Requirement according to NS 3058	Value	Requirement fulfilled
Volume of gas sample measured corrected to standard conditions	dm^3	1:6.1	673	yes
Average dry gas meter temperature during the measuring period	°C	1:6.1	29	yes
Particulate concentration	g/dm^3	2:6.3	5,86924E-05	yes
Particulate emission rate	g/h	2:6.4	17,30	yes
Particulate emission rate adjusted to reported emission	g/h	2:6.4	19,40	yes

Rhein-Ruhr Feuerstätten Prüfstelle

Proportional rate variation intervals (PRi) for category 4

Proportional rate variation for interval over 10 min:	Requirement according to NS 3058	PRi / %	Requirement fulfilled
10	2:6.6	98,01	yes
20	2:6.6	98,70	yes
30	2:6.6	98,85	yes
40	2:6.6	99,23	yes

Proportional rate variation evaluation for category 4

Proportional rate variation for interval over 10 min:	Requirement according to NS 3058	PRi / %	Requirement fulfilled
PRi for 90% included in [90 %, 110 %]	2:6.6	100	yes
PRi for 0% excluded of [80 %, 120 %]	2:6.6	100	yes

Specifications of the test fuels used according to Table B.1 of the EN 13240

Test fuel	W [%]	A [%]	Non-permanent ingredients [%]	H [%]	C [%]	S [%]	Hu [kJ/kg]	Analyse RA-Nr.
Profile wood spruce	14,3	0,61	84,6	6,90	42,50	0,01	15557	16-06918-001
Analyses of samples have been carried out by RAG Ruhranalytik Laboratorium für Kohle und Umwelt GmbH, Wilhelmstr. 98, 44649 Herne (accredited testing laboratory to DIN EN ISO/IEC 17025:2005) and by the UCL Umwelt Control Labor GmbH, Josef-Rethmann-Str. 5, 44536 Lünen (accredited testing laboratory to DIN EN ISO/IEC 17025:2005).								

Table of the measuring instruments

Measuring object	Measuring principle	Brand	Measuring range	Measuring precision
CO_2	NDIR	Rosemount Typ: NGA 2000 PM 103	0 - 20 %	± 1 % relating to final value of the measuring range
CO	NDIR	Rosemount Typ: NGA 2000 PM 103	0 - 3 %	± 1 % relating to final value of the measuring range
Amount of particles	Analytical balance	Fa. Sartorius Typ: A200S PM 135	0 - 210 g	± 0,1 % mg
Temperature	Thermal element NiCr-Ni; accor. to DIN EN 60584-1 DIN EN 60584-2	Measuring converter Delphin Systeme	140 °C 960 °C	Thermal element < 1 % relating to final value of the measuring range
Fuel consumption	Platform Scale	PM 131	20 - 600000 g	± 20 g
Measurement value logging	Datalogger	Delphin Technology AG PM 165	0-20 mA, 0-10000 mV,	± 0,01 v. Ew; ± 0,01 v. MB
Velocity in Dil. Tunnel	Pitot	PM 211		
Velocity in Meas. Train	back pressure Measuring	Digital Manometer PM 211		
Sampling probe	10 mm id			
Dilution tunnel	172 mm id			
Sample recover and weighing procedure	Filters + washing	Using desiccator		
Differential pressure measuring converter		PM 141		

RRF
Rhein-Ruhr Feuerstätten Prüfstelle

Test results: Particulate emission rate adjusted to reported emission

Particulate emission rate adjusted to reported emission E_{ad} [g/h]	Category	Burn rate m_i [kg/h]	Weighted factor [-]	[%]
5,44	1	1,25	0,5593	32
3,72	2	1,67	0,5481	31
18,18	3	2,00	0,4374	25
19,40	4	2,96	0,2120	12

Emission requirements for enclosed wood heaters: Non catalyst stove

Parameter	Requirement according to NS 3059 (3)	Test results	Requirement fulfilled
Maximum allowable emission for one test	≤ 20 g/kg	9,09	yes
Maximum weighted mean value (E_v)	≤ 10 g/kg	5,14	yes

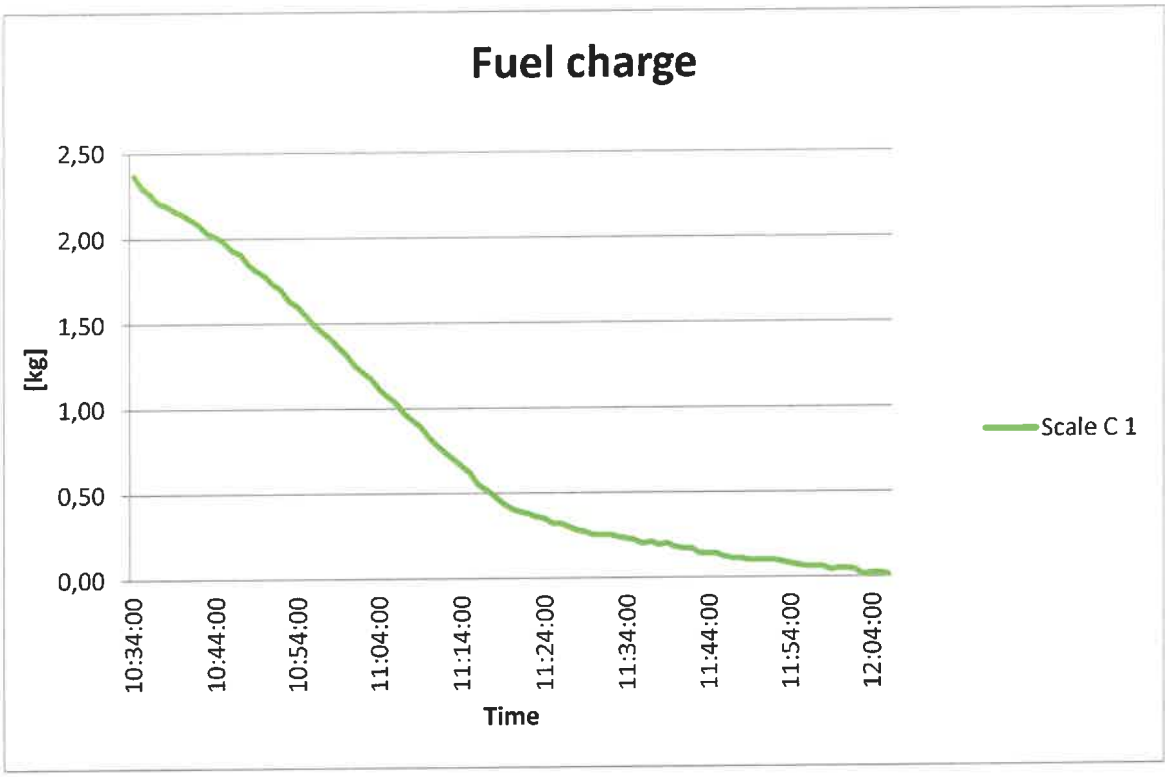
Weighted particulate emission from the tests

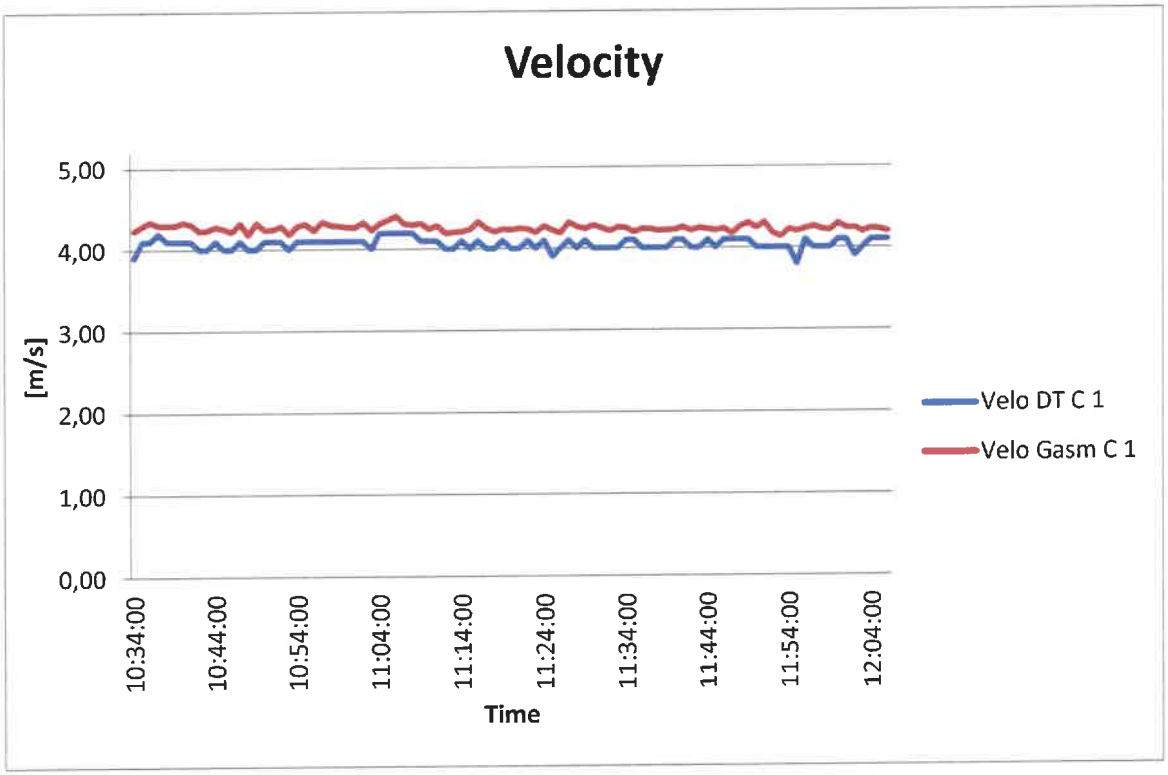
Parameter	Unit	Value
Weighted particulate emission from the tests (E_w)	g/h	9,76

The wood heater Rokra 3S fulfils the
Norwegian requirements for smoke

Rhein-Ruhr Feuerstätten Prüfstelle

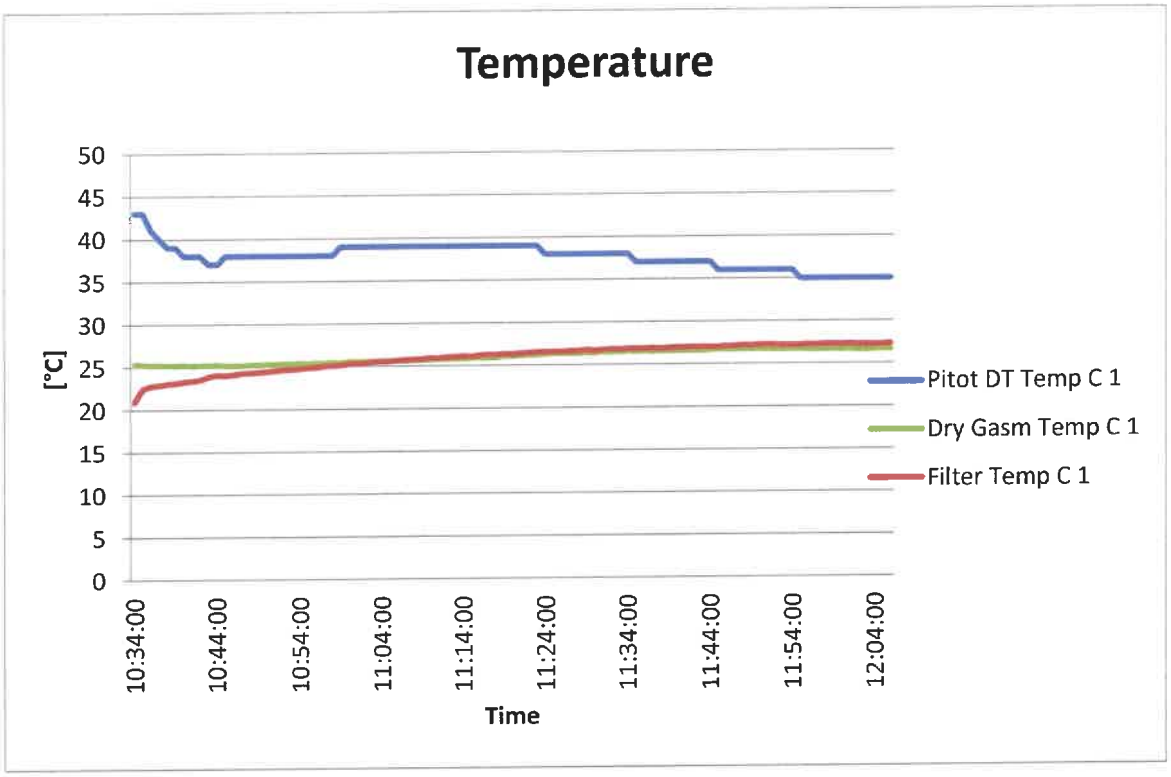
Figures for category 1

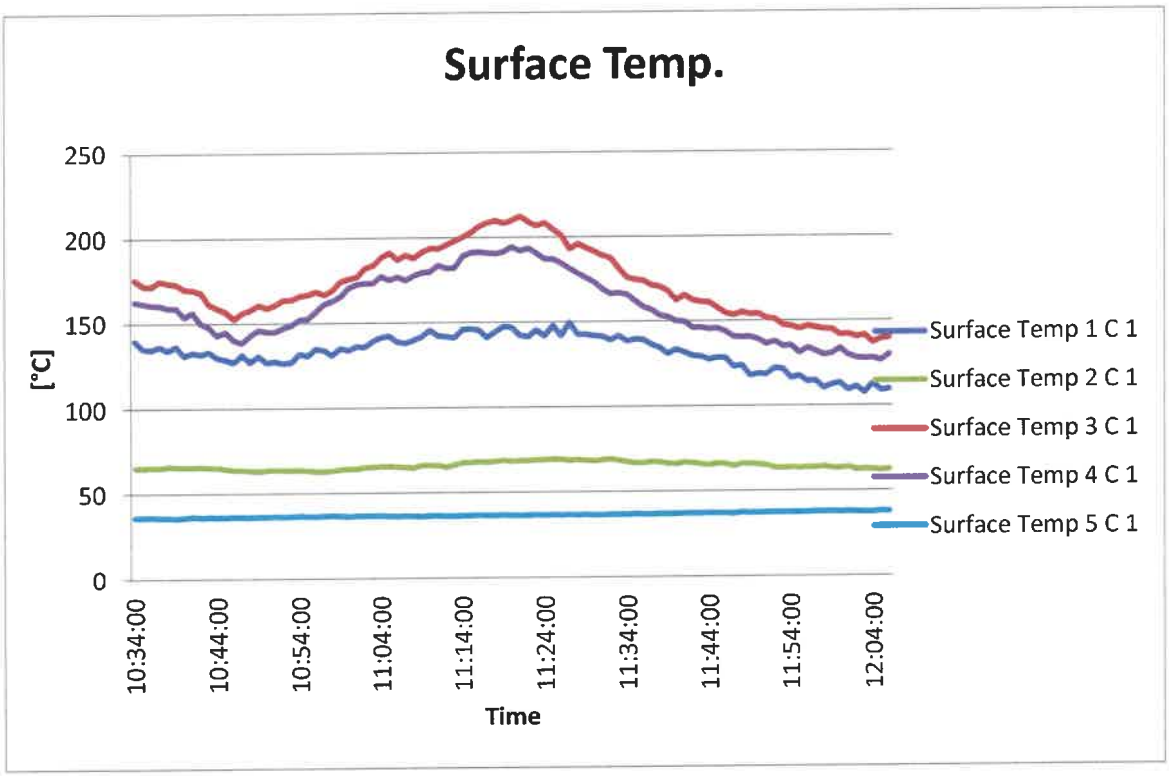




Rhein-Ruhr Feuerstätten Prüfstelle

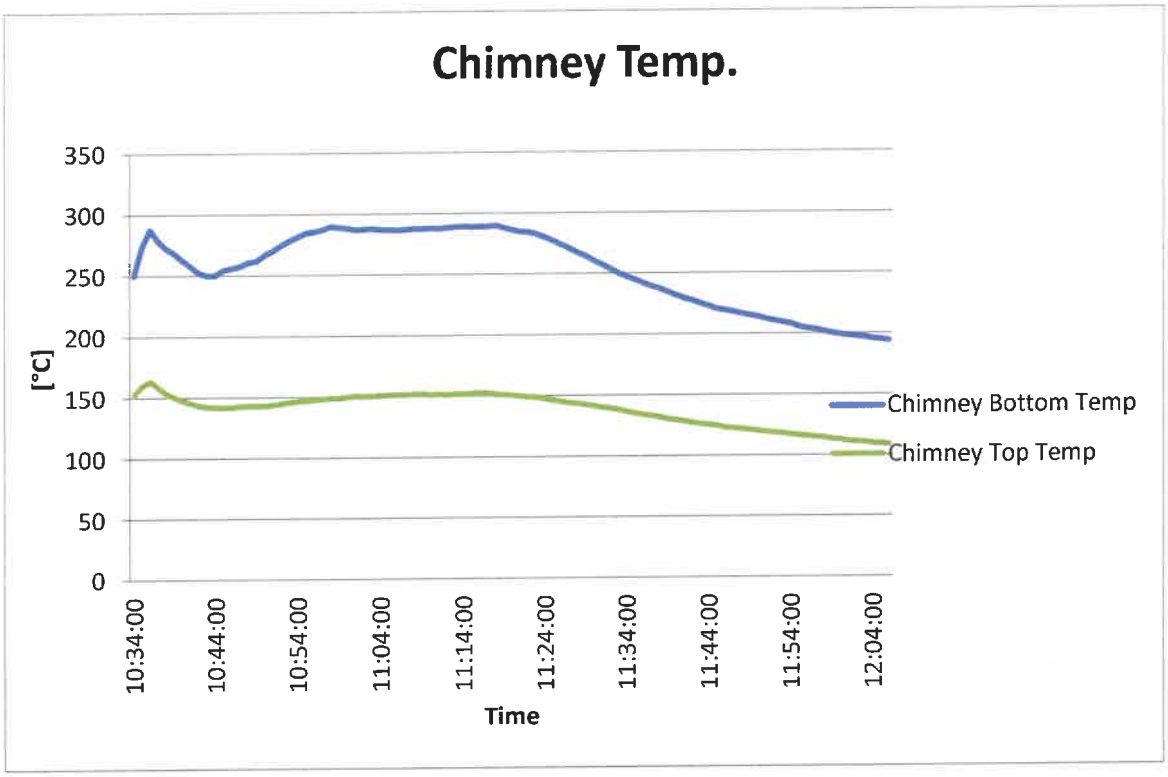
Figures for category 1

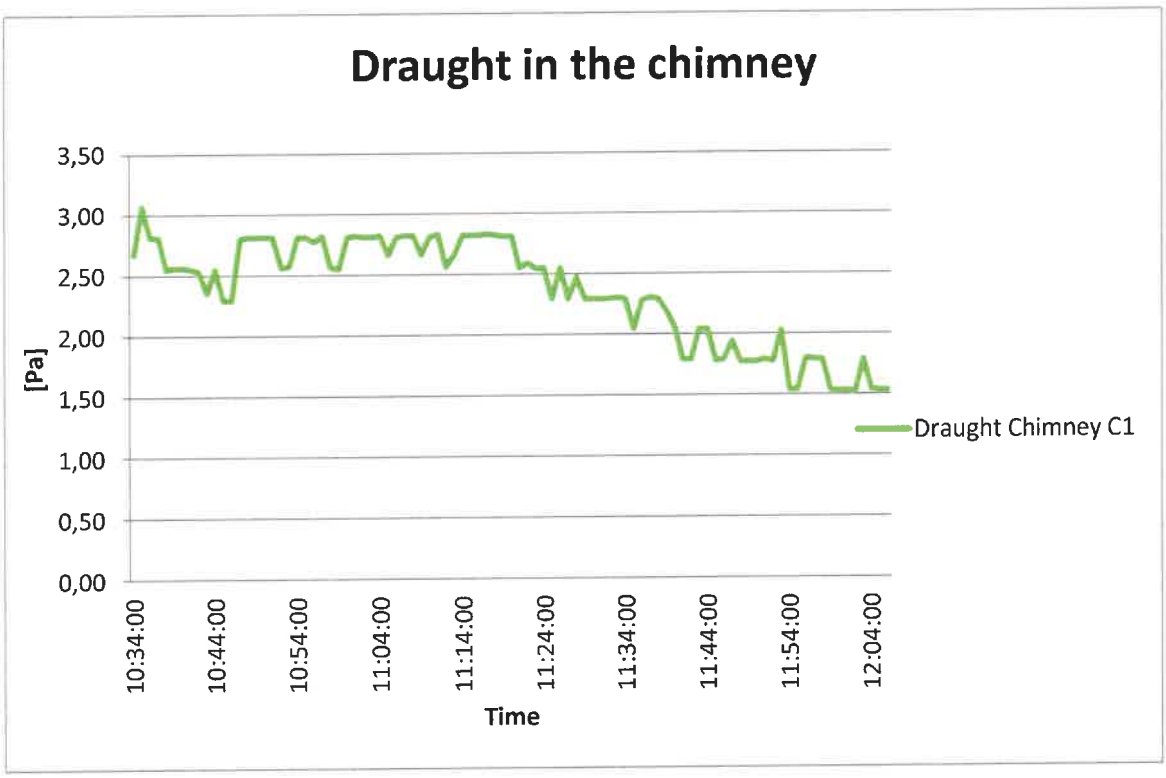




Rhein-Ruhr Feuerstätten Prüfstelle

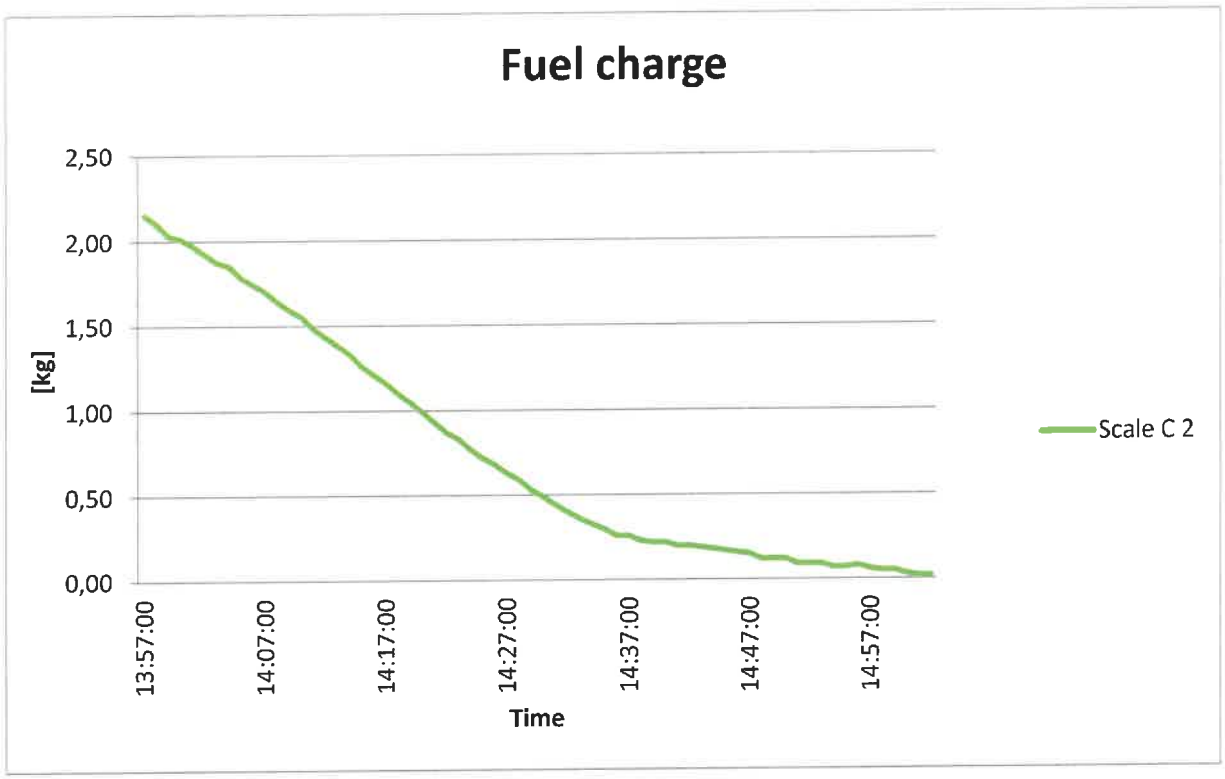
Figures for category 1

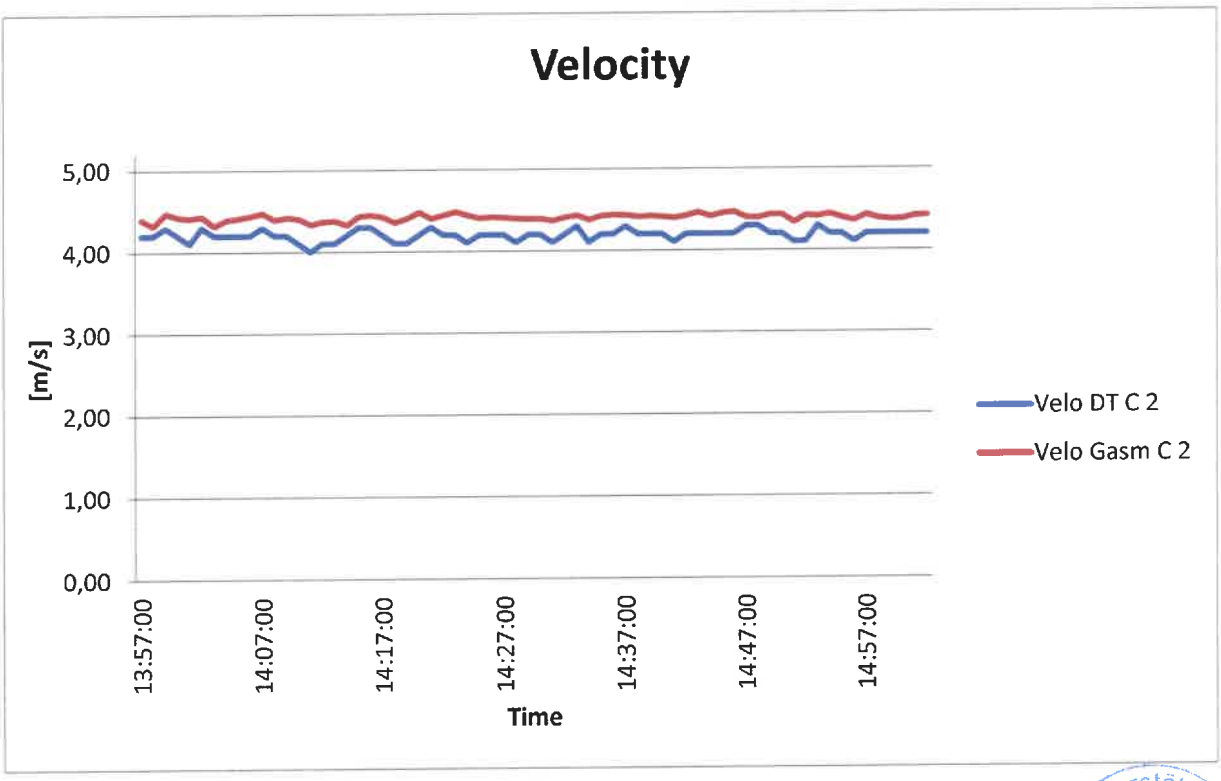




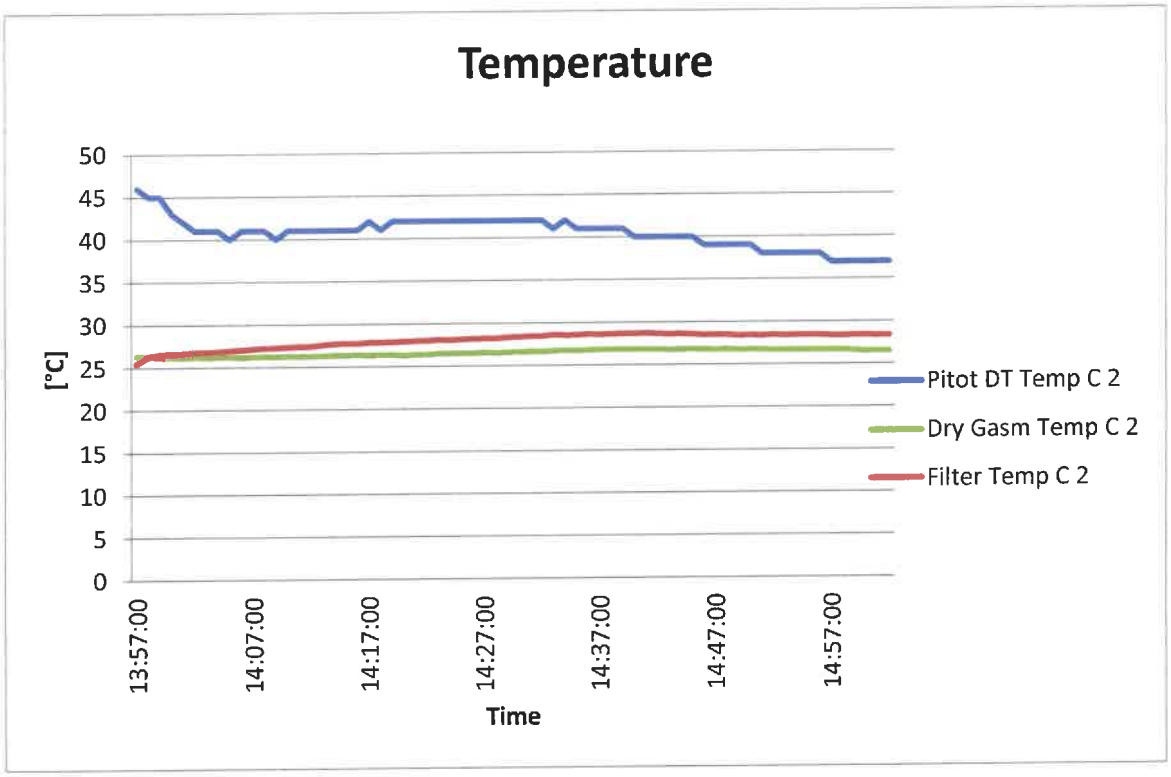
Rhein-Ruhr Feuerstätten Prüfstelle

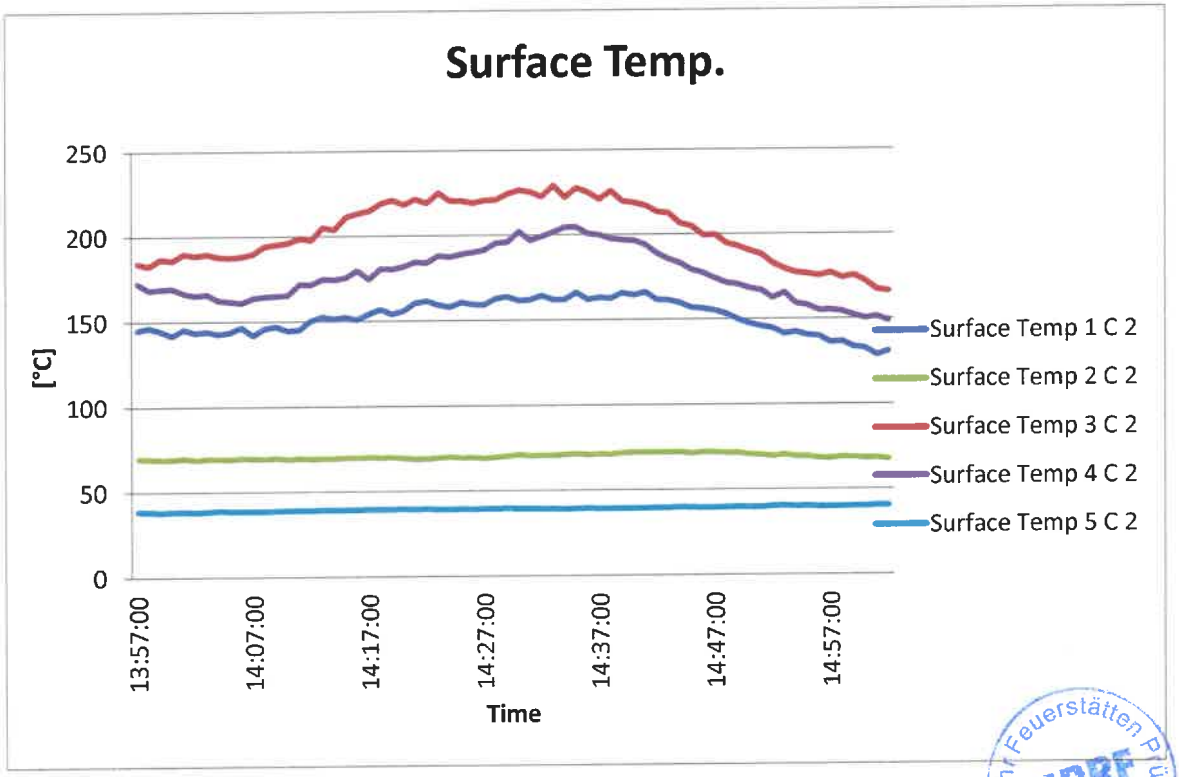
Figures for category 2



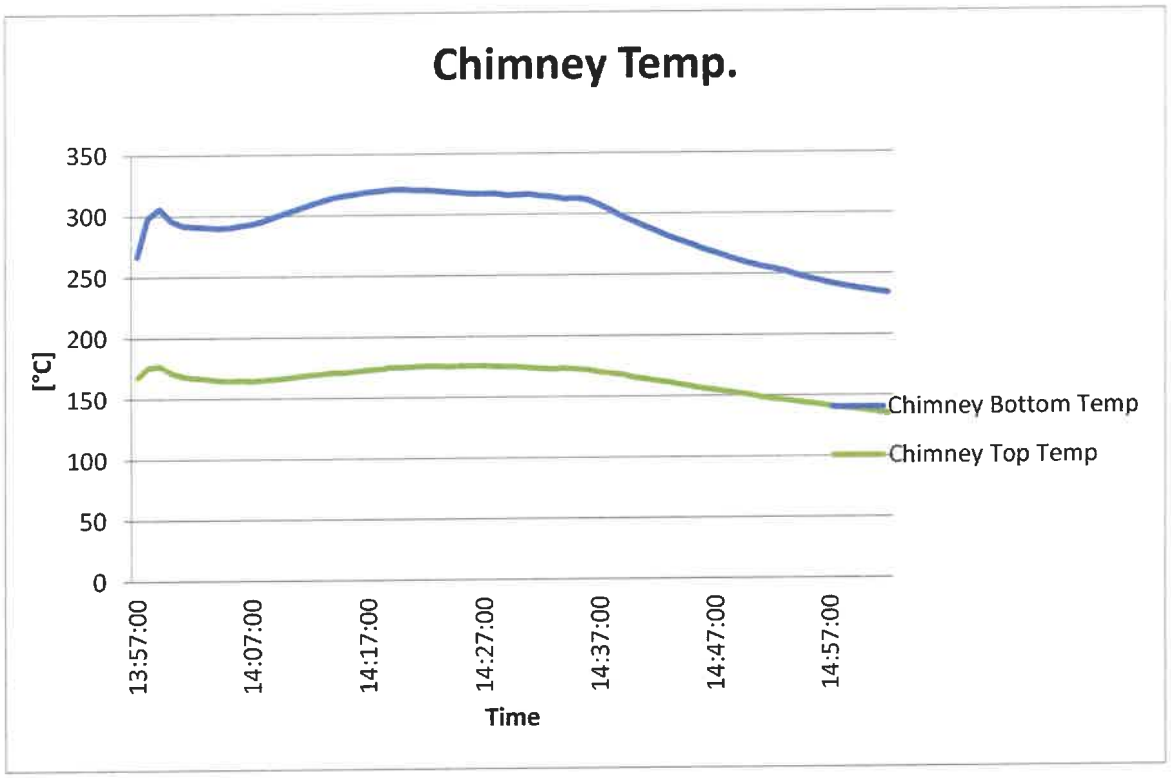


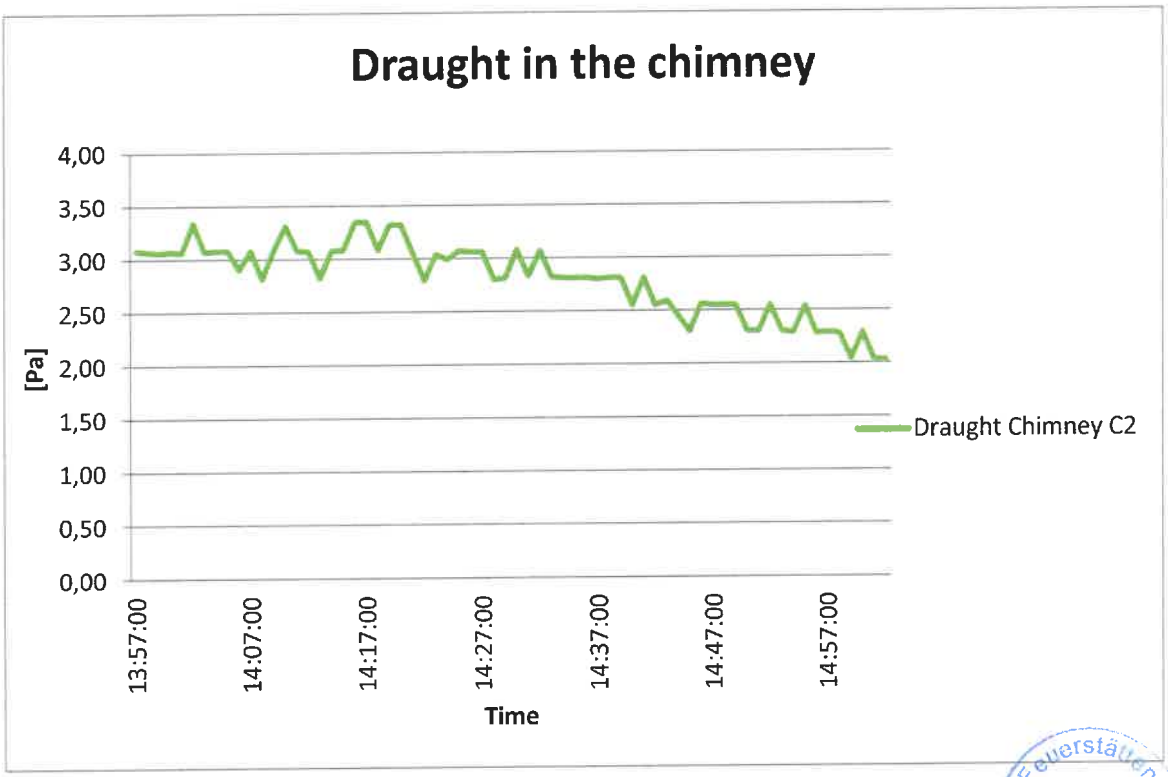
Figures for category 2





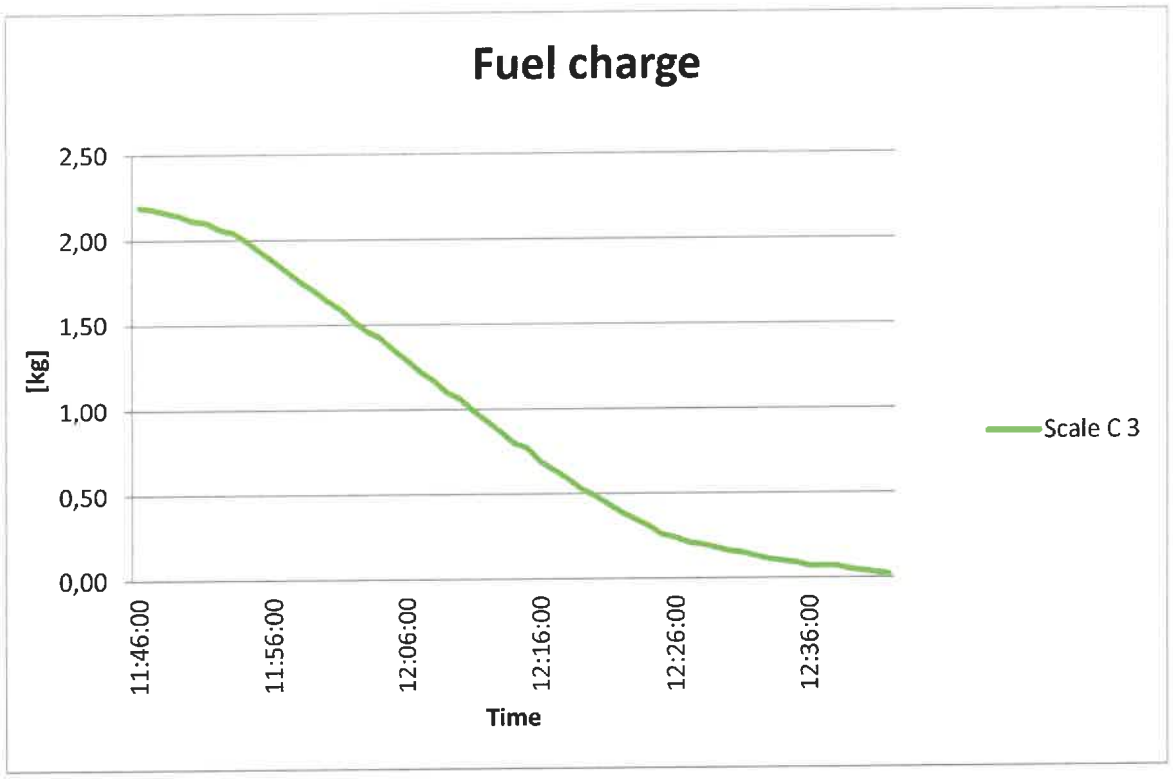
Figures for category 2

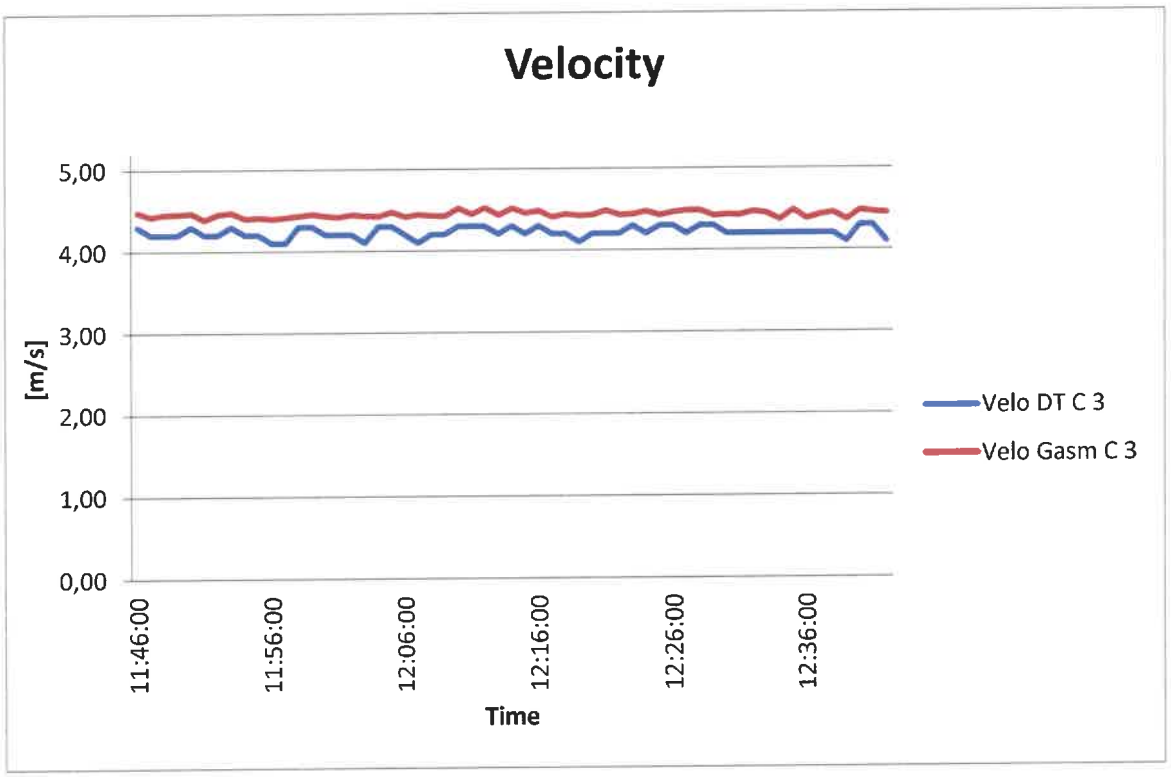




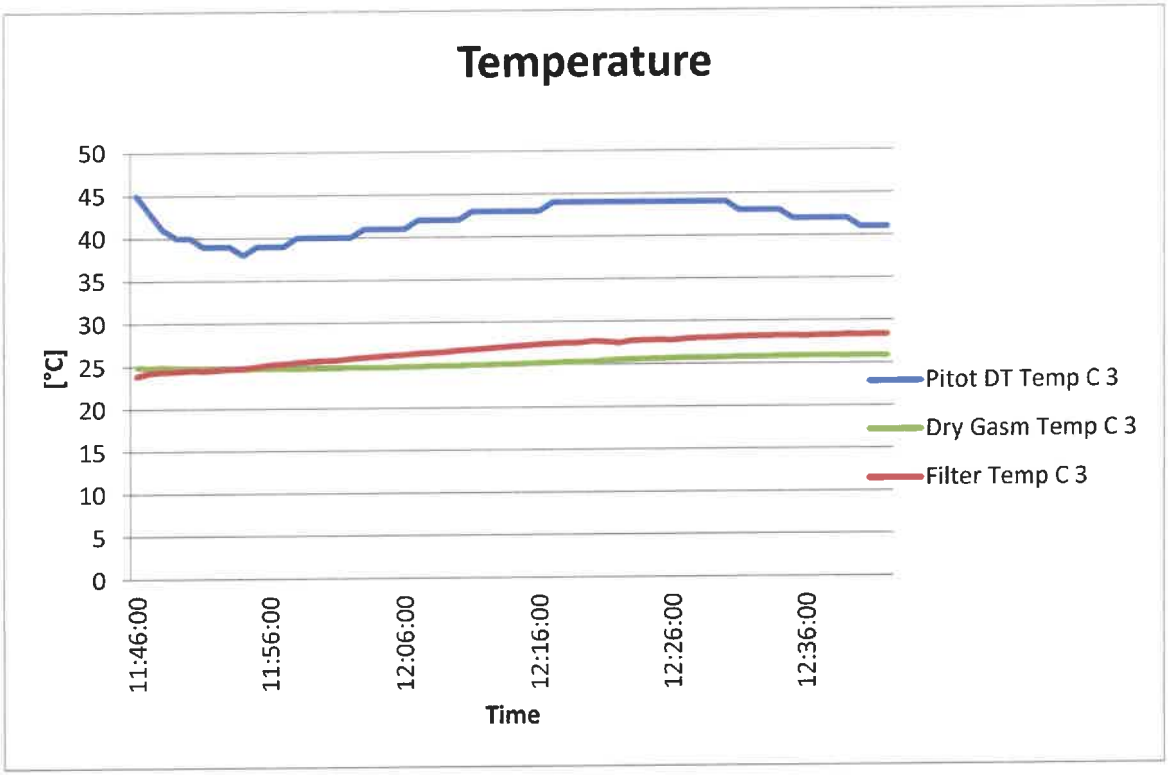
Rhein-Ruhr Feuerstätten Prüfstelle

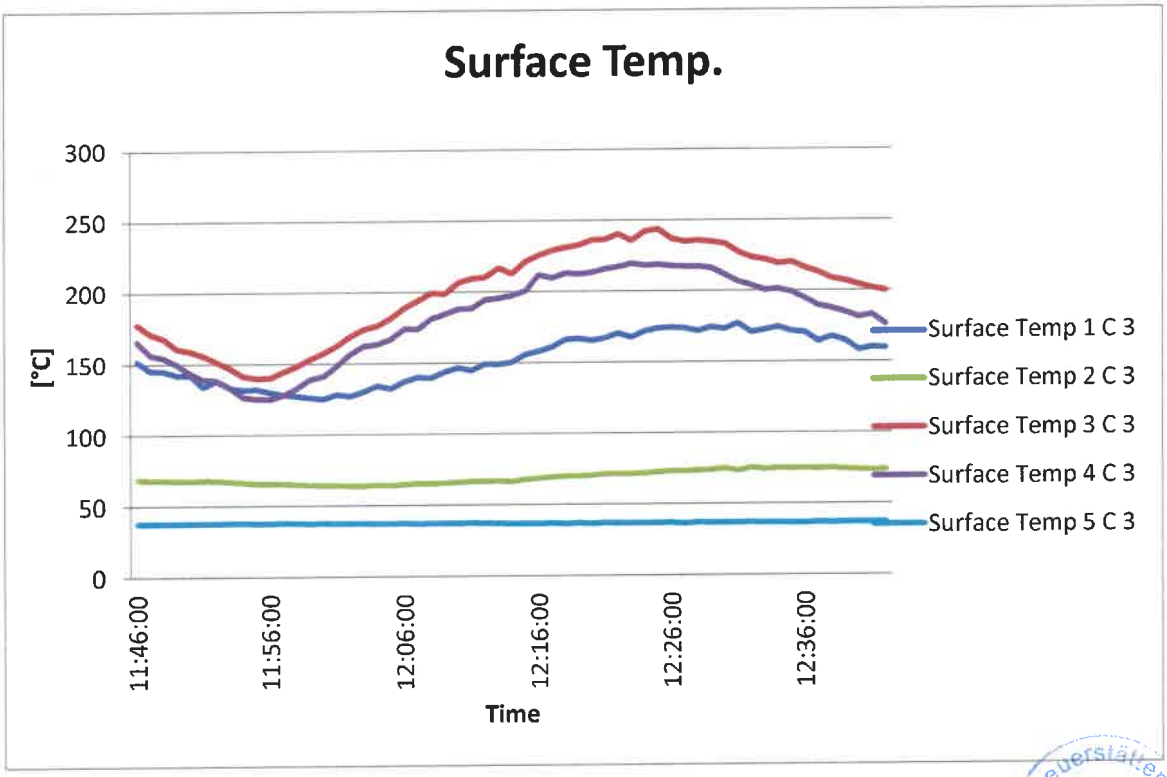
Figures for category 3



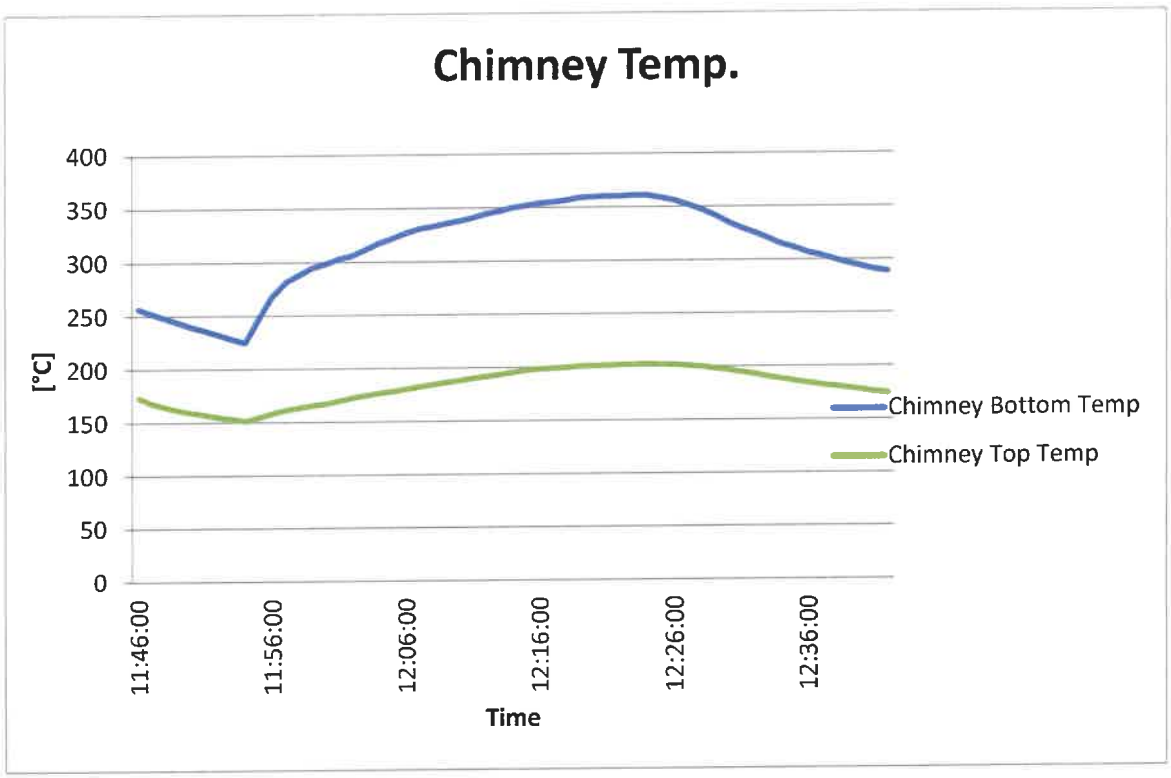


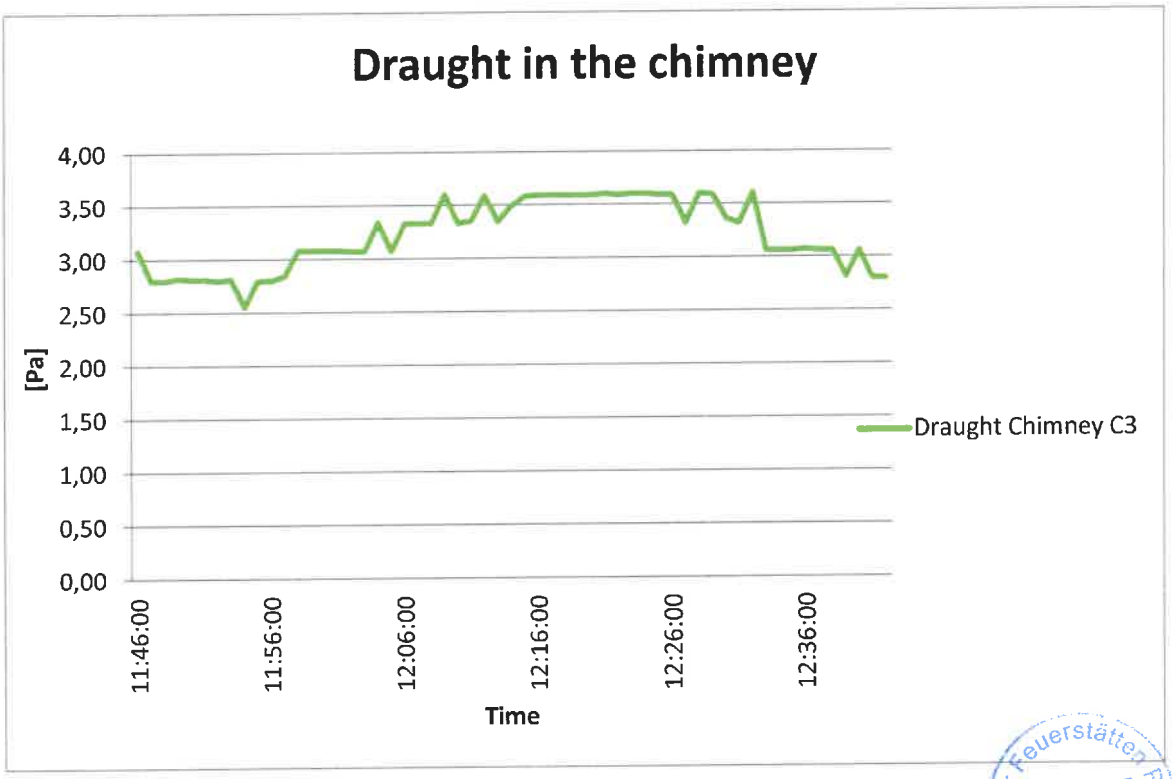
Figures for category 3



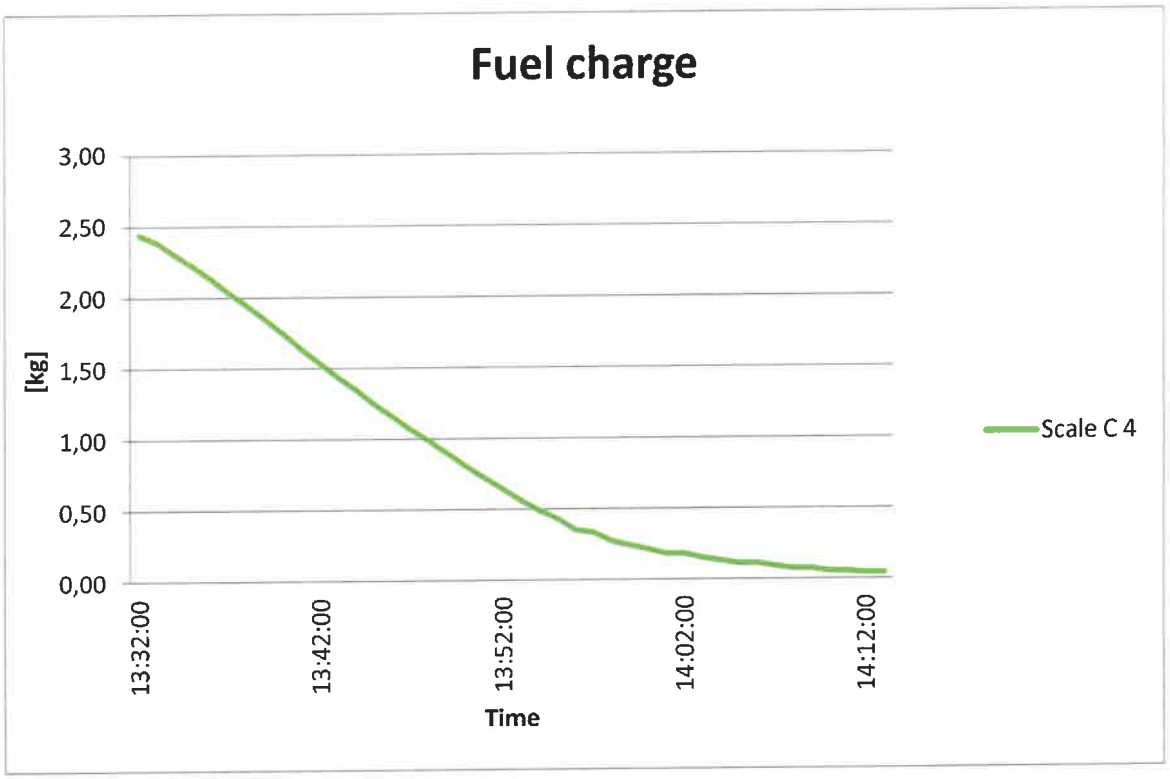


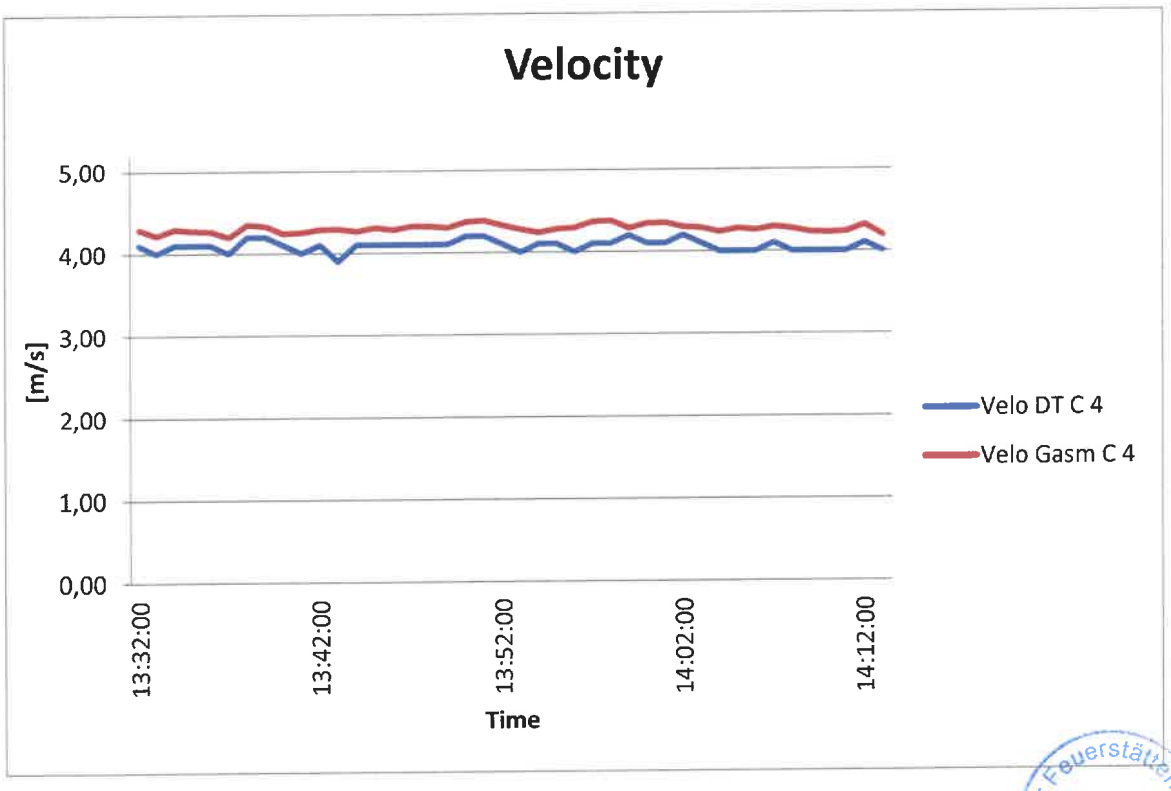
Figures for category 3





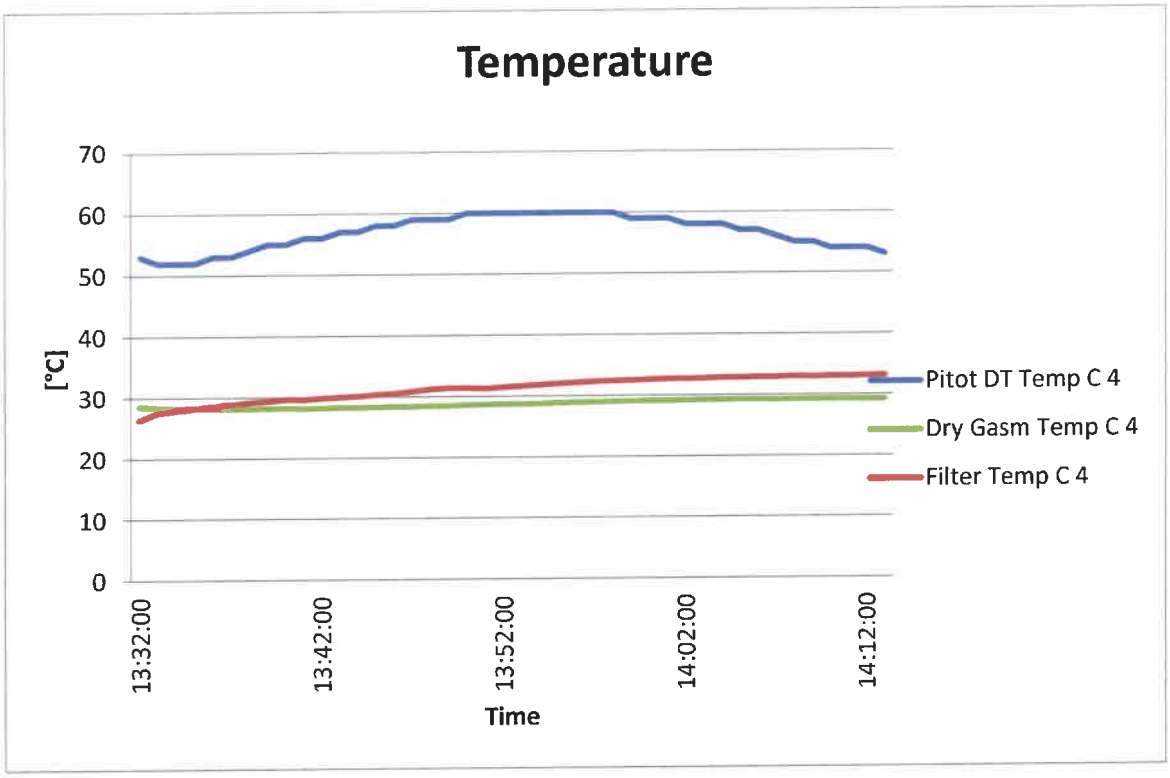
Figures for category 4

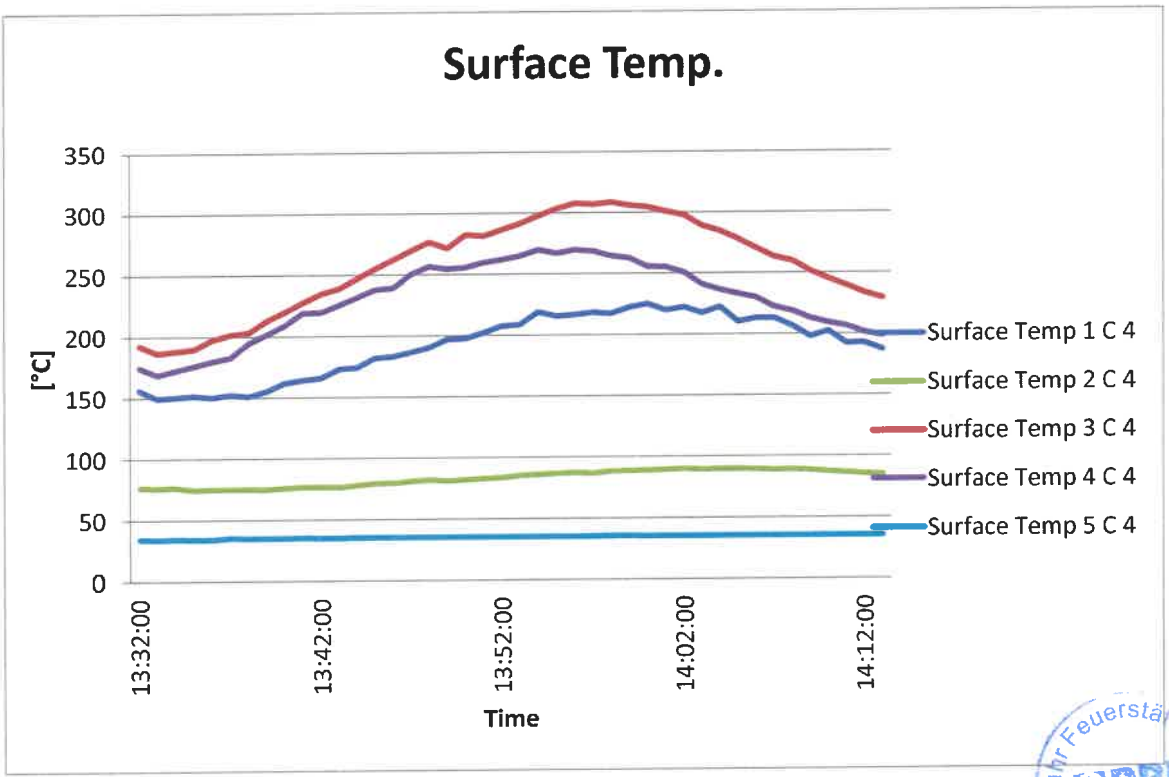




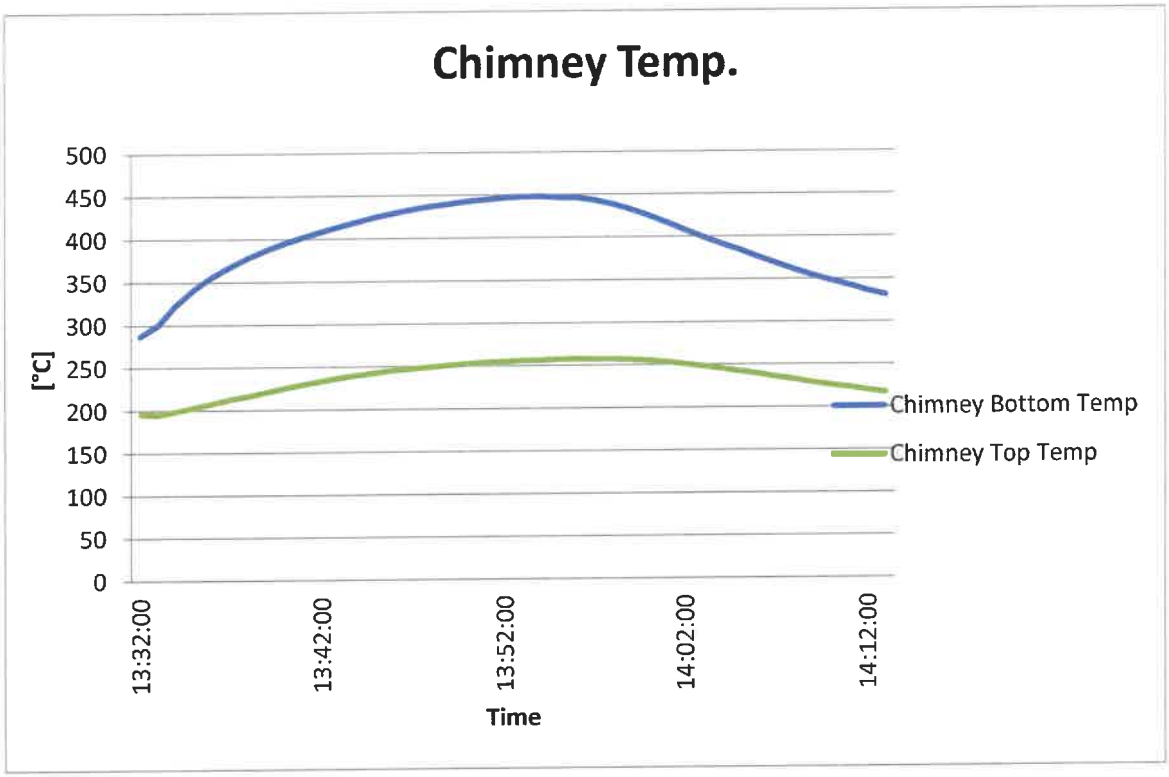
Rhein-Ruhr Feuerstätten Prüfstelle

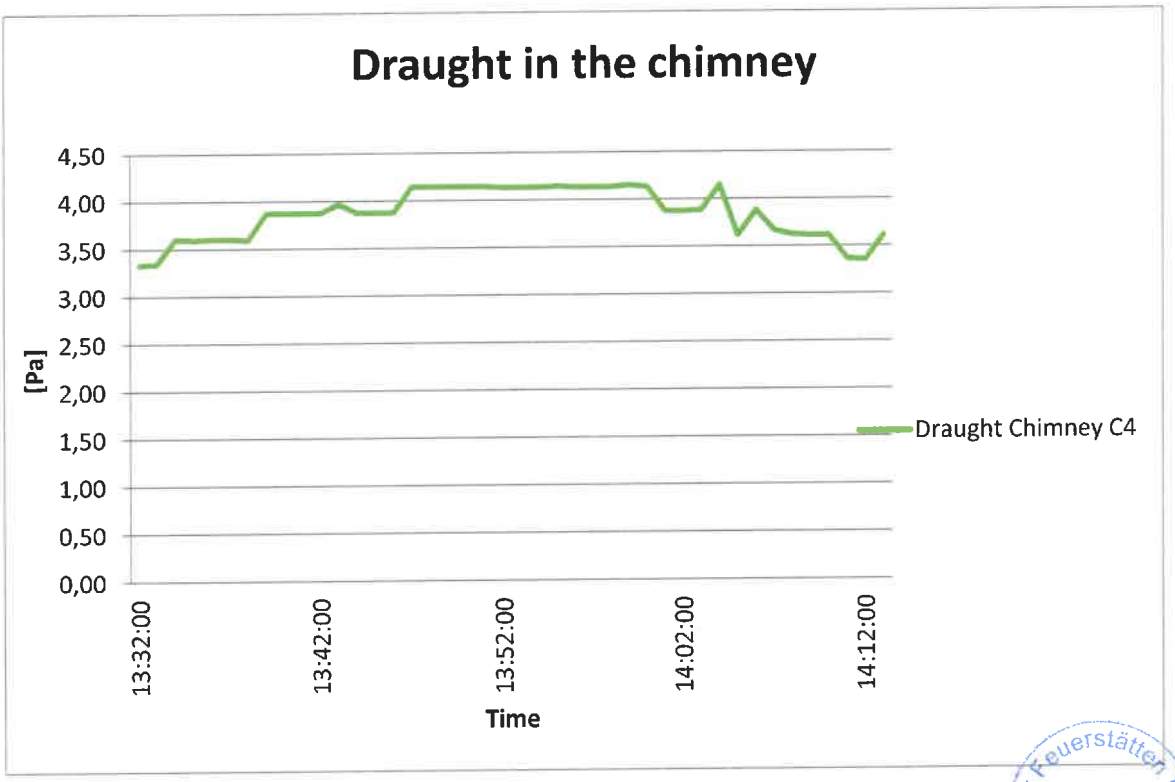
Figures for category 4





Figures for category 4





Photography of the stove

Front view

Temperature sensor on the top

Temperature sensor at the bottom

Temperature sensor on the left side

Temperature sensor on the right side

Air slide 135 mm on (on but without starting air)

Air slide on and starting air

Air slide 90 mm up

Air slide 50 mm up

Batch