SGS

INITIAL TYPE TEST REPORT

INSTYLE CORNER SLIM 660/570

COMMISSIONED BY:

DRU VERWARMING BV

INITIAL TYPE TEST REPORT

INSTYLE CORNER SLIM 660/570

EZKA/2021-02/00022-1

APRIL 16, 2021

Laboratory

SGS NEDERLAND BV

NOTIFIED BODY 0608

Customer

DRU Verwarming BV

Postbus 1021
6920 BA Duiven
The Netherlands

Approved by

J. Dekker
Project Leader

R. Kuipers
Operational Manager Air Monitoring

SUMMARY

This report contains the test results of a room heater fired by solid fuels in accordance with NEN EN 13229:2001 and NEN EN 13229-A2:2004.

Brief description of the project

Description	
Date of test	March 17, 2021 March 22, 2021 March 23, 2021
Manufacturer	DRU Verwarming BV Postbus 1021 6920 BA Duiven The Netherlands
Principal	DRU Verwarming BV
Appliance	Instyle Corner Slim 660/570
Test category	Initial type test

Abstract of the test results

Essential characteristic			
Test fuel	Beech		
Fire safety	Pass		
Emission of combustion products (related to 13% O2)	CO:	0.08	vol%
	NO_x:	104	mg/m_0^3
	C_xH_y:	51	mgC/m_0^3
	Dust:	18	mg/m_0^3
Surface temperature	Pass		
Measured thermal output	7.4 kW		
Energy efficiency	80.0 %		
Release of dangerous substances	Pass		

Room heater **Instyle Corner Slim 660/570** is an intermittent burning appliance. The appliance is not suitable for installation on a shared flue gas system.

This initial type test report consists of pages 1 until 15 and the annexes 1 until 3.

In addition this report contains the test results of a room heater fired by solid fuels in accordance with A.4.11.2.2 FprEN 16510-1:2016 (not an official part of the EN13229). See Appendix 4.

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LIST OF APPENDICES

1. Version history		
Version	Date	Changes
0	April 16, 2021	Issued as final version
1		
2		
3		

Whenever a new version is made, the prior version is cancelled.

Project Description

General information

Company name	DRU Verwarming BV
Address	Postbus 1021, 6920 BA Duiven, The Netherlands
Internet address	www.dru.nl
Client reference number	-
SGS reference number	EZKA/2021-02/00022-1

Appliance

Appliance name	Instyle Corner Slim 660/570
Category	Space heating appliance fired by solid fuel.
Method	In accordance with NEN EN 13229:2001 and NEN EN 13229-A2:2004

Measurement details

Kind of measurement	Initial type test.
Measurement period	March 2021
Measuring staff	R. van den Berg
Author	J. Dekker

Quality

For a list of the accredited activities (RvA L092) of the SGS Nederland BV, Industries & Environment Department in Arnhem, The Netherlands, we refer to the Dutch Accreditation Council RvA website (https://www.rva.nl/system/scopes/file_nls/000/000/076/original/L092-scn.pdf?1491490288).

Disclaimers

2. INTRODUCTION

SGS Nederland BV, Environment, Health and Safety, carried out an initial type test of room heater **Instyle Corner Slim 660/570**. The appliance is made by DRU Verwarming BV.

This report contains the test results of a room heater fired by solid fuels in accordance with NEN-EN 13229: 2001 + A2:2004. Interpretations, opinions and assessments of conformity to clauses of this standard (chapter 4) are done as Notified Body. Unless described otherwise the reported tests (chapter 5) are covered by RvA-accreditation.

A short description of the appliance is included in chapter 3. Chapter 4 describes the results of the assessments. The results of the measurements are presented in chapter 5.

This report is issued under the following condition:

1. *It applies only to the tested model submitted to the test specified in this report.*
2. *It does not imply that the notified body has performed any surveillance or control of its manufacture.*
3. *The manufacturer shall ensure that the manufacturing process assures compliance of the products with the approved model subject to this certificate.*
4. *The applicant shall inform the notified body of all modifications made to the approved model which must receive, when necessary, additional approval leading to an addition to the original EC type-examination certificate.*
5. *As technical advances or new work could affect the conclusion of this EC type-examination, the applicant shall regularly keep himself informed of any modification made to tests carried out on the approved model by the notified body.*
6. *According to article 3h of the "Assignment of SGS Nederland as Notified Body" you can lodge an appeal against our decision. This appeal shall be made by registered mail within 30 days after the date of the SGS decision. SGS undertakes to investigate the appeal independently and with the necessary care and will communicate its motivated decision by registered mail within 30 days after receipt of the notice of appeal. Each party itself shall bear its costs resulting from this internal appeal procedure. In case this appeal is dismissed by SGS a second internal appeal procedure will not be possible.*
7. *The manufacturer always retains the overall responsibility for the conformity of the product with all the requirements of the applicable directive(s), even if some stages of the conformity assessment are carried out under the responsibility of a notified body.*

3. PROJECT DETAILS

In this chapter, the information of the appliance and the laboratory are given.

3.1 SPECIFICATION OF THE APPLIANCE

Inset appliance made of sheet metal equipped with a front window door. The combustion chamber is insulated with ceramic elements. Furthermore the appliance is equipped with a baffle plate made of ceramic and steel elements. The air supply (primary, secondary and air wash) is regulated with one handle on the front side of the appliance.

The appliance is placed in a convection box. The flue gas outlet is located at the top of the appliance.

Variants

There are two variants of the insert available. The only difference between these variants is the position of the side glass in the door (corner left or right). This change has no influence on the technical performance of the appliances. Therefore no objections exist from the side of the test laboratory in using the data obtained with the tested room heater (corner at the right side) for the variant with the corner at the left side.

3.2 SPECIFICATION OF THE LABORATORY

Table 1 Information of the test laboratory

Description	
Laboratory	SGS Nederland BV Leemansweg 51 6827 BX Arnhem The Netherlands
Notified under EC number	0608
Date of test	March 17, 2021 March 22, 2021 March 23, 2021
Test category	Initial type test
Standard	NEN-EN 13229: 2001 + A2:2004

The analysis of the fuel is subcontracted by an ISO 17025 accredited laboratory within the SGS-group.

4. RESULTS OF ASSESMENTS

This chapter contains the results of the assessments.

4.1 USED MATERIALS, DESIGN AND CONSTRUCTION

Table 2 Results of assessment of conformity with chapter 4 of EN 13229:2001 and EN 13229 A2:2004

	Clause	Approved
Production documentation (not reviewed) Documentation and/or drawings contain: - Specification of used materials - Nominal heat output using recommended fuels When fitted with a boiler, specification of the: - used welding process - permissible max. operating temperature, °C - permissible max. operating pressure, bar - type test pressure, bar - water heating output, kW	4.1	-
Construction (4.2) **The conformity to the * marked requirements of clause 4.2 is based on the declaration of the manufacturer.**		
General construction requirements *No asbestos *No hard solder, containing cadmium *Thermal insulation materials: non-combustible, no health risk *Design of spare parts ensures correct fitting *Seals made of fire cement supported by adjacent metal surfaces When operated in accordance with the provisions of the appropriate test and exposed to the associated mechanical, chemical and thermal stresses, the appliance shall operate reliably and safely such that during normal operation no combustion gases posing a hazard can escape into the room in which the appliance is installed nor can embers fall out.	4.2	 ok ok ok ok n/a ok
Flue spigot or socket Secure and gastight connection Overlap length: D < 160 mm → > 25 mm D > 160 mm → > 40 mm Insertion depth > 25 mm	4.3	 ok ok n/a ok
Combustion control device Easily accessible permanently marked	4.4	 n/a n/a
Flue ways and cleaning tools Minimum size: - bituminous coal > 30 mm - no bituminous coals > 15 mm - easy cleaning with commercially available tools or brushes - cleaning tools provided by the manufacturer	4.5 4.6	 n/a ok ok n/a

	Clause	Approved
Fire doors and charging doors Large enough to fill appliance with commercially available fuels accidental opening is prevented positive closure	4.7	 ok ok ok
Combustion air supply Primary air inlet control: - manual or thermostatic control - adjusting control clearly visible and permanently marked - correct setting for each fuel type is identifiable - no obstruction of the air inlet control by ash or unburnt fuel Secondary air (air wash) inlet control: - Passage of air is not restricted by fuel	4.8	 ok ok n/a ok ok
Internal flue gas diverter Adjusting control clearly visible or permanently marked Set position can be maintained No isolation of firebox from flue gas outlet possible When removable – correct assembly is ensured	4.9	 ok ok ok ok
Bottom grate When removable – correct assembly is ensured capable of de-ashing without undue effort	4.10	 n/a ok
Front fire bars – deepening plate When removable – correct assembly is ensured No accidental dislodging	4.11	 n/a ok
Ash pan and ash removal Volume of ash pan enough for two full charges of fuel* No obstruction of combustion air * No ash pan but enough volume to retain the ash for two full charges.	4.12	 ok ok
Integral boiler (4.13)		
Note: No boiler.		n/a
Control of flue gas If flue damper is fitted: - easily operable - aperture ≥ 20 cm2 or 3% of the cross-sectional area - position of damper can be identified If draught regulator is fitted: - easily accessible for cleaning	4.14	n/a
Cleaning of heating surfaces Accessible for inspection and cleaning Special cleaning tools (if necessary) supplied by the manufacturer	4.15	 ok n/a

4.2 SAFETY REQUIREMENTS

Table 3 Results of assessment of conformity with chapter 5 of EN 13229:2001 and EN 13229 A2:2004.

	Clause	Approved
Cut-off device for appliances without doors Appliance can be separated from the chimney No hindering of control or cleaning Device maintains set position Position of device is clearly marked Installed in flue gas collector or flue spigot	5.1	n/a
Temperature of adjacent combustible materials Temperature ≤ 65 K (see installation and operating manual for information about clearing distances and insulation)	5.2	ok
Operating tools Operating tools provided Touched areas without tools Temperature: metal < 35 K porcelain < 45 K plastics, rubber, wood < 60 K	5.3	ok n/a
Natural draught safety test Flue draught ≥ 3 Pa If Flue draught is < 3 Pa: - CO-volume ≤ 250 dm3/10 h	5.4	n/a
Spillage of gas, discharge of embers No escape of harmful gases Embers do not fall out	5.5	ok ok
Temperature in fuel storage container Temperature < 65 K	5.6	n/a
Thermal discharge control If discharge control is part of appliance: opens at water temperature > 105 °C or opens at water temperature > declared value	5.7	n/a
Strength and leak tightness of boiler shells No leakage or permanent deformation after completion of the tests	5.8	n/a
The conformity to clause 5.11 is based on the declaration of the manufacturer.		
Electrical safety Components in compliance with EN 60335-2-102 (replacement of EN 50165)	5.11	n/a

4.3 APPLIANCE INSTRUCTIONS

Table 4 Results of assessment of conformity with chapter 7 of EN 13229:2001 and EN 13229 A2:2004.

Instructions	Clause	Approved
In the language of the country of intended destination	7.1	-
Not in contradiction to the requirements and test results	7.1	-
Contains the required information	7.2	-
Contains the required information	7.3	-
Not reviewed. The manufacturer must supply a manual that conforms to the EN13229 with every sold appliance.		

4.4 MARKING

Table 5 Results of assessment of conformity with chapter 8 of EN 13229:2001 and EN 13229 A2:2004.

	Clause	Approved
Permanently and legibly marked	8	-
Readable	8	-
Durable and abrasion proof	8	-
No discoloration or detachment	8	-
Contains the required information	8	-
Not reviewed. The manufacturer must supply a CE-plate that conforms to the EN13229 with every sold appliance.		

5. MEASUREMENTS

In this chapter the measurement methods, the deviation from the standard and the test results are given.

5.1 MEASUREMENT METHODS

The appliance was tested to the applicable methods of the standard.
In order to ensure that our services maintain the quality level required by our clients, SGS Nederland BV hold the NEN-EN-ISO/IEC 17025 (Testlab) accreditation under number L092. The test laboratory of SGS is notified under EC number 0608. The following test methods are covered.

Table 6 Used methods with accreditation

Description	Method
Performance test at nominal heat output	EN 13229:2001/ A.4.7
Temperature safety test for wood burning and multi fuel appliances	EN 13229:2001/ A.4.9.1

The analysis of the fuel is subcontracted by an ISO 17025 accredited laboratory within the SGS-group.

5.2 DEVIATION OF THE STANDARD

The nominal heat output tests and the safety test are done in compliance with NEN-EN 13229:2001 and NEN-EN 13229 A2:2004. The following deviations from the demands as set in the standard are made:
- The analysis of the test fuel was done according to widely accepted EN-Standards. In general the used Standards improve the accuracy and reduce the variability of the analysis. This deviation from the standard has no influence on the results of the type test.

5.3 TEST FUEL SPECIFICATION

In this paragraph the results of the test fuel analysis are given.

Table 7 Test fuel specification

Test fuel	Moisture %	Ash %	Volatile matter %	H %	C %	S %	Hu* kJ/kg	Size, length
Beech	12.3	0.41	85.8	5.2	43.9	0.01	16,234	30 x 7 cm
Fir timber	12.0	0.19	86.8	5.3	45.0	0.02	17,022	>33 cm

* Lower Calorific Value of the test fuel (as fired basis).

Picture 1 Positioning of the wood during the nominal tests

5.4 PERFORMANCE TEST AT NOMINAL HEAT OUTPUT (BEECH)

The following table contains the test results in accordance with A.4.7 of NEN-EN 13229:2001 and NEN-EN 13229 A2:2004. Test runs 1 and 2 are executed consecutive.

Table 8 Test results nominal heat output

		Clause	Test 1	Test 2	Test 3	Mean of 3 tests	Approved
Date (dd-mm-yy)			17-03-21	17-03-21	17-03-21		
Test fuel			Beech	Beech	Beech	**Beech**	
Total mass	kg		1.43	1.44	1.34	**1.40**	
Setting of air controller							
- Combustion air			"0"	"0"	"0"	**"0"**	
Mean flue draught	Pa	6.1	13.1	12.8	12.6	**12.8**	ok
Mean flue gas temperature	K#		276	268	259	**268**	
Mean CO_2 concentration	%		11.24	10.39	10.68	**10.76**	
Mean CO concentration	%		0.11	0.11	0.09	**0.11**	
Mean CO concentration at 13% O_2	vol%	6.3	0.08	0.09	0.07	**0.08**	ok
Mean CO concentration at 13% O_2	mg/m_0^3		968	1066	828	**955**	
Mean CO_2 concentration during dust measurement	vol%		11.58	11.26	11.14	**11.32**	
Dust concentration	mg/m_0^3		28	22	31	**27**	
Dust concentration at 13% O_2	mg/m_0^3		19	15	22	**18**	
EN-PME: Dust conc. at 13% O_2	mg/m_0^3		26	27	27	**27**	
NO_x concentration	mg/m_0^3		137	132	163	**144**	
NO_x concentration at 13% O_2	mg/m_0^3		95	99	119	**104**	
C_xH_y concentration	mgC/m_0^3		88	83	41	**70**	
C_xH_y concentration at 13% O_2	mgC/m_0^3		61	62	30	**51**	
Combustion time	h	6.5	0.67	0.71	0.68	**0.69**	ok
Dev. from required comb. time	%		-11	-5	-9	**-8**	
Thermal heat losses	%		18.7	19.4	18.4	**18.8**	
Chemical heat losses	%		0.6	0.7	0.5	**0.6**	
Heat losses in the residue	%		0.5	0.5	0.5	**0.5**	
Efficiency	%	6.4	80.2	79.4	80.6	**80.0**	ok
Mean nominal heat to space	kW	6.6	7.7	7.3	7.1	**7.4**	ok
Theoretical heating output	kW		6.9	6.9	6.5	**6.8**	
Flue gas mass flow	g/s		6.0	6.1	5.8	**6.0**	

above ambient: room temperature during tests: 19 ˚C

5.5 TEMPERATURE SAFETY TEST

The appliance is placed in a convection box. Between the convection box and the vermiculite plates thermocouples were placed to monitor the temperatures during the safety test. Table 9 contains the test results in accordance with A.4.9.1 of EN 13229:2001 and EN 13229 A2:2004.

In a combustible surrounding the side and back wall must be insulated. Characteristics of the used vermiculite plates: “Pumica K, 550”, У10= 0.14W/(mK). Appliance must be placed on a non-combustible floor. On top of the appliance only non-combustible materials must be used.

Table 9 Test results

		§	Test	Approved
Date (dd-mm-yy)			**22-03-21**	
Test fuel			**Fir timber 5x5**	
Total load	kg		**25.0**	
Number of loads			**8**	
Setting of air controller				
- combustion air			**100%**	
Mean flue draught	Pa	6.1	**16.3**	ok
Ambient temperature	℃		**19.4**	
Max. surface temperature (above ambient)				
Floor directly below appliance	K	5.2	**34**	n/a*
Side wall **(with 4 cm of insulation)**	K	5.2	**63**	ok
Side wall, window **(distance 50 cm)**	K	5.2	**49**	ok
Back wall **(with 6 cm of insulation)**	K	5.2	**65#**	ok
Top **(non-combustible)**	K	5.2	**-**	-
Floor in front of appliance **(distance 60 cm)**	K	5.2	**65**	ok*
Front **(distance 140 cm)**	K	5.2	**60**	ok
Loss of fire bed		4.2	**no**	ok
Escape of harmful combustion gases		4.2	**no**	ok
Damage on the appliance caused by the test		4.2	**none**	ok

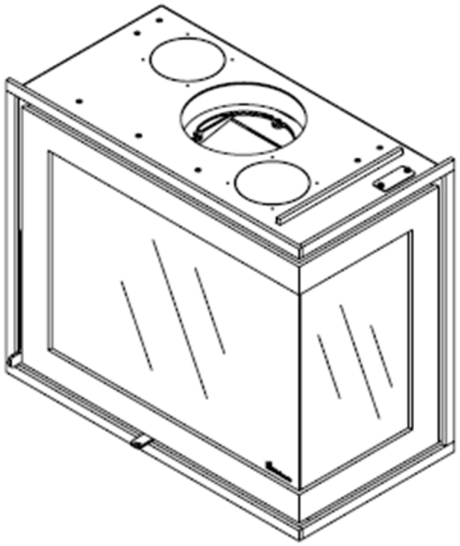
Calculated value.
* Appliance must be placed on a non-combustible floor.

APPENDICES

APPENDIX 1: PICTURE OF THE APPLIANCE

APPENDIX 2: DRAWINGS OF THE APPLIANCE

Right



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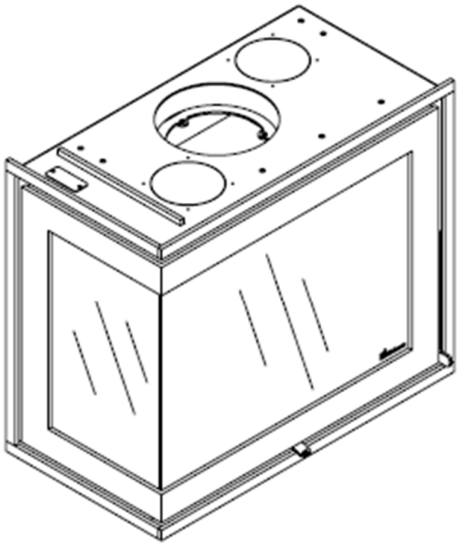

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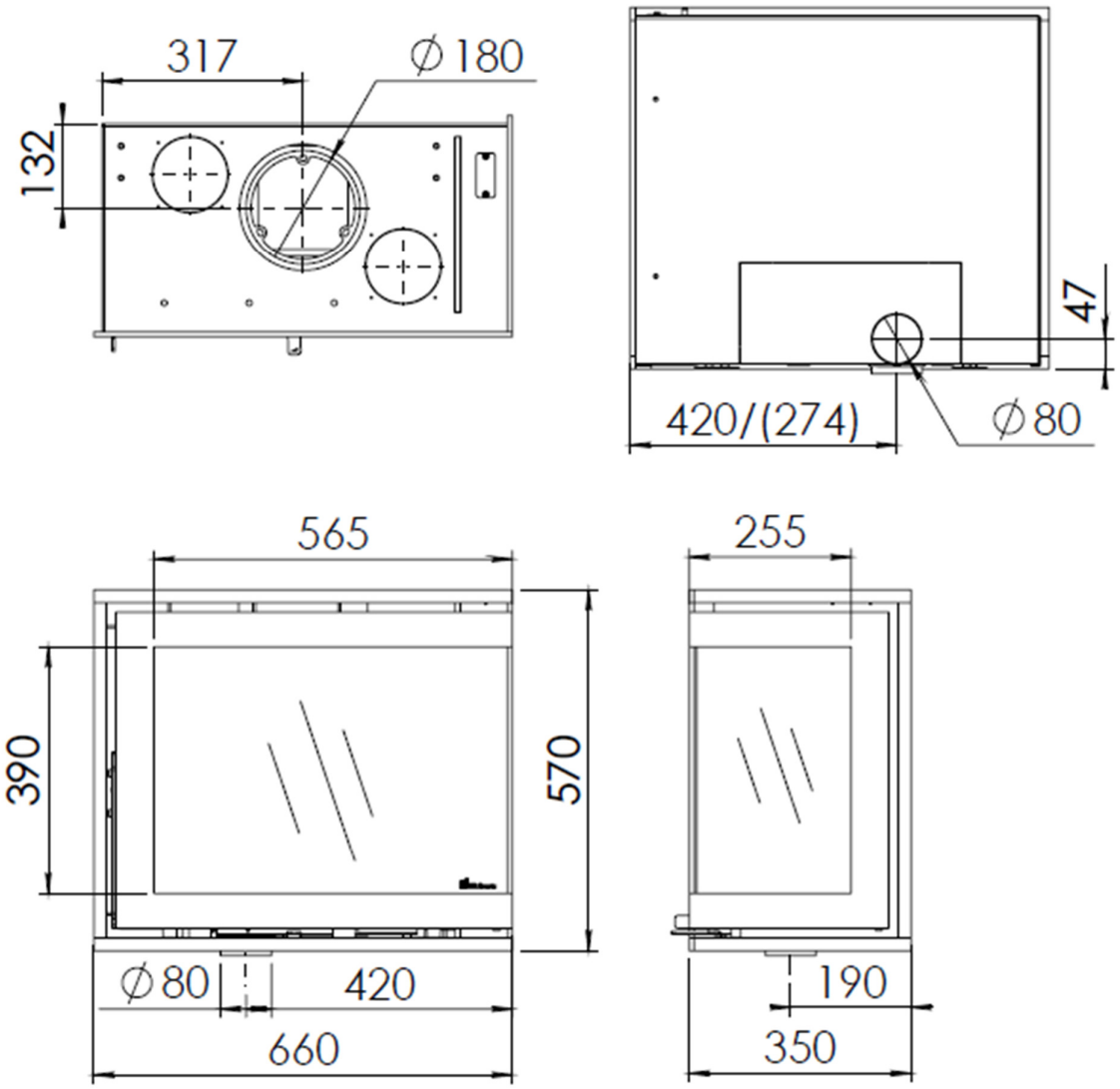

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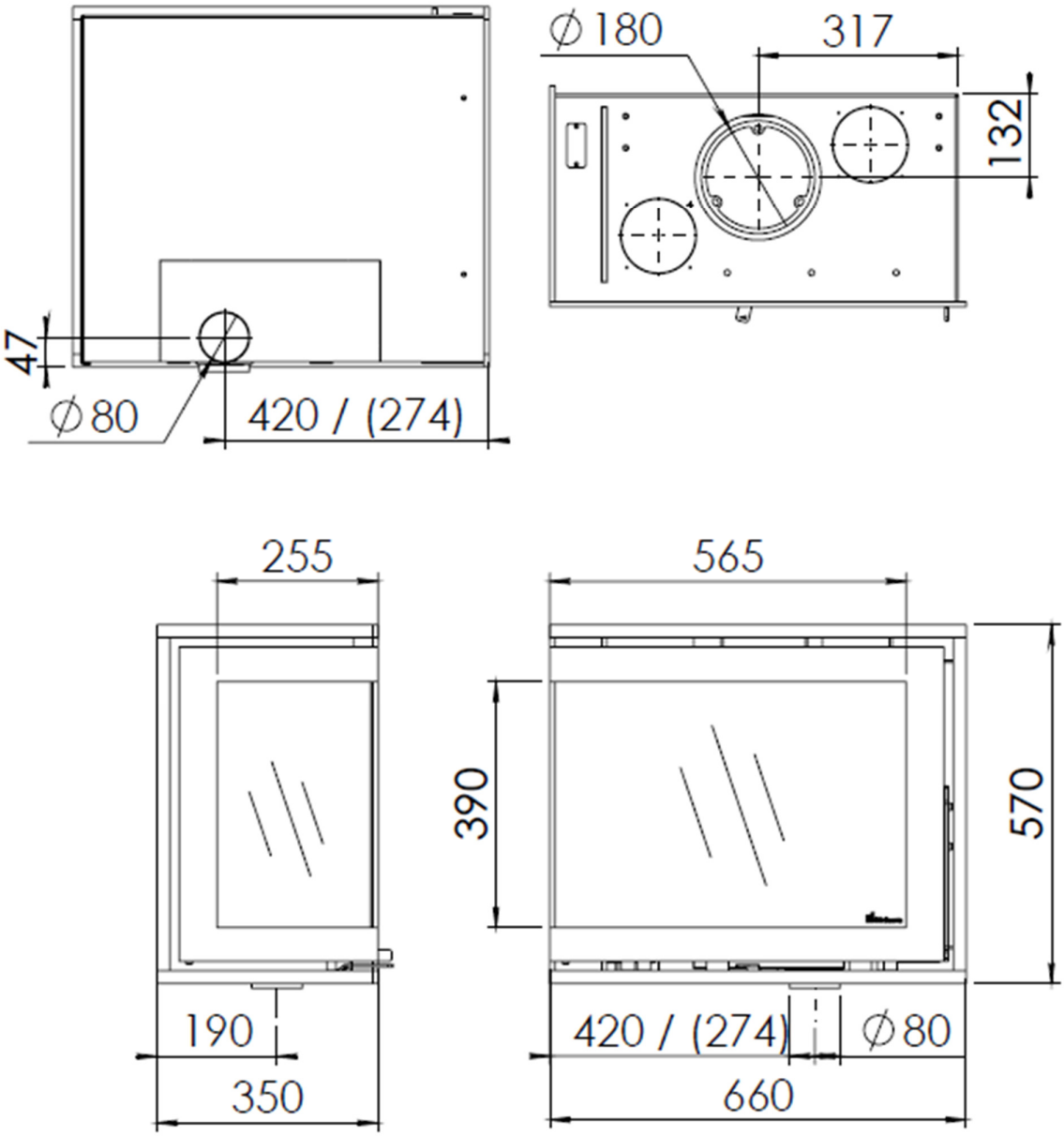


APPENDIX 3: METHODS AND MEASUREMENTS UNCERTAINTIES

The measurements marked with an asterisk in the table below, are covered by ISO 17025 accreditation.

Description	SGS Procedure/Standard	Uncertainties [1)]
Determination of the particulate concentration (gravimetric, non-diluted)	ENVI-K-002* EN16510-1 (F2 Heated filter)	30%
Determination of the C_xH_y concentration (equivalents of C_3H_8)	ENVI-K-002* EN12619*/ EN16510-1 (FID)	20%
Determination of the NO_x concentration (equivalents of NO_2)	ENVI-K-002* EN14792*/ EN16510-1 (D.2.2 Chemiluminescense)	9%
Determination of the CO_2 concentration	ENVI-K-002* ISO12039*/ EN16510-1 (Nondispersive infrared)	9%
Determination of the CO concentration	ENVI-K-002* EN15058*/ EN16510-1 (Nondispersive infrared)	9%

1) The stated uncertainties refer to the 95% confidence interval (2 sigma). The stated percentages are related to the actual measurement results, unless indicated otherwise.

APPENDIX 4: LEAK TESTS

A4-1: MEASUREMENTS

In this chapter the measurement methods, the deviation from the standard and the test results are given.

A4-2 MEASUREMENT METHODS

The appliance was tested to the applicable methods of the standard.

The appliance was firstly heated during a series of nominal tests and a safety test (initial type test). Thereafter the charging door was opened to a typical refuelling position and closed in a tight manner without further action for 6 000 open-close cycles.

The leak tightness of the appliance is measured at three different static overpressures between 5 Pa and 15 Pa.

A4-3 DEVIATION OF THE STANDARD

The following deviations from the demands as set in the standard are made:

- None.

A4-4 MEASURING EQUIPMENT

The following equipment was used for the measurements.

Table A1 Measuring equipement SGS

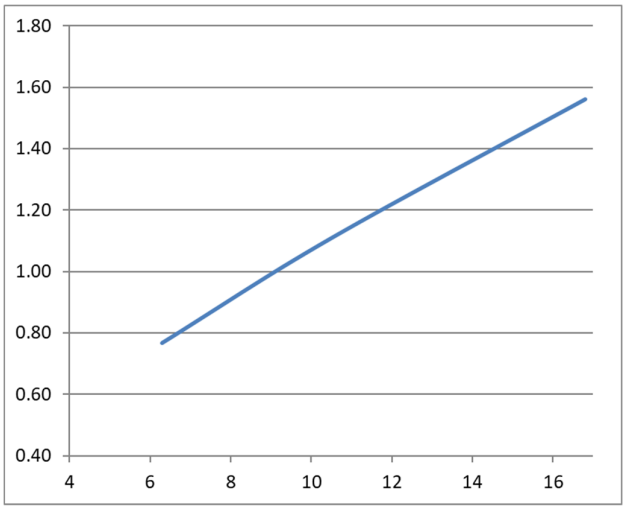
Component	Analyser	Identification	Measurement principe	Uncertainty
Temperature	Thermocouple K	SGS-13-471	Chromel-Alumel	2 K
Flow	Drygasmeter	SGS-12-030	-	< 2%
Differential pressure	Testo 6351	SGS-12-006	-	≤ 1 Pa
Differential pressure	Testo 6351	SGS-12-007	-	≤ 1 Pa

A4-5 RESULTS

The following figure contains the test results in accordance with A.4.11.2.2 of FprEN 16510-1:2016.

Figure 1 Leakage at measured pressures

Pressure P Pa	Leakage L Nm3/h
6.3	0.8
10.5	1.1
16.8	1.6



Interpolation: The leakage of the appliance at an overpressure of 10 Pa is 1.06 Nm^3/h.

Table A2 contains the results of the assessment.

Table A2 Results of the assessment to clause 6.9 of FprEN 16510-1:2016

		Test	Requirement	Approved
Date (dd-mm-yy)		**23-03-21**		
Setting of air slides - Combustion air		**open**		
Leakage at 10 Pa	[Nm3/h]	**1.06**	≤ 3	ok
CO concentration in the flue gas (nominal heat output)	[ppm at 13% O_2]	**764**		
The product of the CO concentration in the flue gas and the leakage of the appliance.	[ppm Nm3/h]	**806**	≤ 2400	ok

The Instyle Corner Slim 660/570 full fills the requirements for a room sealed appliance (in accordance with A.4.11.2.2 FprEN 16510-1:2016).