

Bellaterra, 26th March, 2024

Test report number: **23/ 32306756_09 M2 (simplified)**

Petitioner: CLASP
1401 K ST NW Suite 1100
Washington, DC 20005 USA

Date of material delivery: From 28th August to 14th September, 2023

Date of testing: From 12th September to 6th November, 2023

TEST REPORT

Corresponding to *domestic hobs*

ISSUE REQUESTED

Partial tests according to the following standards and specifications of the Petitioner for the pilot test:




- EN 60350-2: 2018 & EN 60350-2:2018 + A1:2021
"Household electric cooking appliances. Part 2: Hobs. Methods for measuring performance".
- EN 30-1-1: 2021
"Domestic cooking appliance burning gas. Part 1: Safety. General"
- CR1404: 1994
"Determination of emissions from appliances burning gaseous fuels during type-testing"
- EN 772-20: 2000
"Methods of test for masonry units – Part 20: Determination of flatness of aggregate concrete, manufactured stone and natural stone masonry units"




This report cancels and replaces the previous one with number 23/ 32306756_09 M1 (simplified) dated 05/01/2024. The reason for the modification is to correct editorial mistakes (reported values), see pages 6 and 7. It's indicated as (M1).

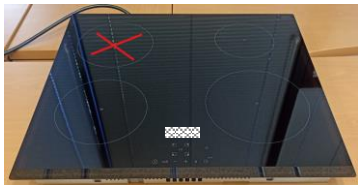

This document has **19** pages of which **0** are annex, this being page number 1.

RECEIVED SAMPLE

Appliance description	Gas-fired and electric cooking appliance (hob)
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Code	HOB 1G	HOB 2G	HOB 3G
Type	gas	gas	gas
APPLUS identification code	23/ 17348	23/ 17343	23/ 17345
Test report	23/ 32306756_01	23/ 32306756_02	23/ 32306756_03
Picture			
Tested cook zone consumption	1,91 kW (Hs)	1,90 kW (Hs)	1,95 kW (Hs)

Code	HOB 4G	HOB 5E	HOB 6E
Type	gas	electric (induction)	electric (radiant / vitro)
APPLUS identification code	23/ 17346	23/ 17347	23/ 17344
Test report	23/ 32306756_04	23/ 32306756_05	23/ 32306756_06
Picture			
Tested cook zone consumption	1,82 kW (Hs)	1830 W	1785 W

Code	HOB 7E	HOB 8E
Type	electric (induction)	electric (resistive)
APPLUS identification code	23/ 17622	23/ 17349
Test report	23/ 32306756_07	23/ 32306756_08
Picture		
Tested cook zone consumption	1820 W	1920 W

REQUESTED TESTS

Tests that have been requested by the Petitioner, based on the standards cited below, but including the Petitioner's modifications on the test methods (according to DTMM ed. 8.7):

DESCRIPTION	Standard / Test method	Clause	Applicable test	
			Electric appliance	Gas appliance
Energy consumption / simmering	EN 60350-2	7.5 / Annex E	X	X
Heating up time	EN 60350-2	7.6	X	X
Energy consumption / shallow frying	Petitioner's protocol	--	X	X
Emissions: CO/CO ₂	EN 30-1-1	7.3.2.4		X
Emissions: NO/NO ₂ /NO _x	CR 1404	Annex I		X
Flatness (cookware)	EN 772-20	--	X	X
Lower power modes	Petitioner's protocol	--	X	X
Leaktightness	Petitioner's protocol	--		X

Remark.- Cookware used for the tests has been selected by the Petitioner.

RESULTS

See the details in the test report of each appliance.

GAS		Pot: Ø180						Material: stainless steel	
		SIMMERING						HEATING UP	
SAMPLE	Parameter	Average power	\overline{T}_S	$t_{90}+t_s$	E_{cw}	$\frac{E_{cw}}{m_{cw}}$	Water boils during test	t_{90}	energy consumption
	TESTS	W	°C	s	W·h	W·h / kg		s	W·h
HOB 1G	Rep. 1	515	94,0	2000	541	360	no	739	363
	Rep. 2	510	96,1	2013	542	361	no	751	360
	Rep. 3	518	95,3	1981	529	352	no	722	348
HOB 2G	Rep. 1	442	89,0	2018	513	342	no	757	372
	Rep. 2	402	88,8	1990	496	331	no	730	351
	Rep. 3	393	88,9	2077	536	357	no	816	398
HOB 3G	Rep. 1	387	88,5	1912	465	310	no	653	326
	Rep. 2	413	88,6	1915	481	321	no	655	334
	Rep. 3	414	88,9	1911	481	321	no	651	336
HOB 4G	Rep. 1	487	95,2	1969	504	336	no	709	341
	Rep. 2	493	96,6	1944	501	334	no	683	327
	Rep. 3	482	92,9	1974	516	344	no	713	342

ELECTRICAL

HOB 5E	Rep. 1	275	95,2	1639	278	185	no	377	184
	Rep. 2	277	94,6	1639	279	186	no	372	186
	Rep. 3	276	94,4	1634	280	187	no	372	187
HOB 6E	Rep. 1	228	93,4	1711	290	194	no	448	213
	Rep. 2	228	91,2	1709	291	194	no	447	215
	Rep. 3	229	90,8	1711	295	197	no	446	218
HOB 7E	Rep. 1	205	88,9	1679	256	170	no	371	187
	Rep. 2	205	88,1	1630	254	169	no	367	185
	Rep. 3	200	89,7	1635	255	170	no	373	188
HOB 8E	Rep. 1	190	91,3	1699	299	199	yes	436	235
	Rep. 2	193	91,1	1693	299	199	yes	430	234
	Rep. 3	194	90,8	1700	301	200	yes	436	236

GAS		Pot: Ø150						Material: stainless steel	
		SIMMERING						HEATING UP	
SAMPLE	Parameter	Average power	\overline{T}_S	$t_{90}+t_s$	E_{cw}	$\frac{E_{cw}}{m_{cw}}$	Water boils during test	t_{90}	energy consumption
	TESTS	W	°C	s	W·h	W·h / kg		s	W·h
HOB 1G	Rep. 1	409	87,7	1930	434	420	no	589	284
	Rep. 2	406	94,0	1864	425	412	no	605	282
	Rep. 3	507	95,4	1844	423	410	no	583	281
HOB 2G	Rep. 1	394	93,8	1976	478	465	no	717	348
	Rep. 2	410	93,1	1969	476	462	no	710	344
	Rep. 3	369	93,7	1966	473	460	no	707	341
HOB 3G	Rep. 1	410	93,4	1861	440	427	no	600	310
	Rep. 2	398	93,2	1871	450	437	no	610	308
	Rep. 3	397	91,9	1874	443	431	no	613	308
HOB 4G	Rep. 1	484	98,4	1835	443	430	no	575	282
	Rep. 2	491	97,9	1860	450	437	no	601	291
	Rep. 3	491	98,6	1859	451	437	no	599	286

ELECTRICAL

HOB 5E	Rep. 1	138	89,7	1524	178	173	no	260	131
	Rep. 2	143	90,2	1525	181	176	no	264	131
	Rep. 3	144	90,3	1520	181	175	no	259	131
HOB 6E	Rep. 1	131	89,8	1647	226	219	no	384	183
	Rep. 2	131	90,3	1653	228	221	no	389	185
	Rep. 3	134	89,9	1643	225	218	no	377	180
HOB 7E	Rep. 1	138	88,8	1523	177	172	no	260	131
	Rep. 2	138	88,3	1520	176	171	no	258	129
	Rep. 3	139	88,1	1529	177	172	no	258	130
HOB 8E	Rep. 1	193	95,9	1650	276	269	no	386	211
	Rep. 2	191	95,5	1654	277	269	no	391	212
	Rep. 3	195	95,1	1645	272	264	no	382	206

GAS		Pot: Ø180						Material: aluminium		HEATING UP	
		SIMMERING									
SAMPLE	Parameter	Average power	$\overline{T_s}$	$t_{90}+t_s$	E_{cw}	$\frac{E_{cw}}{m_{cw}}$	Water boils during test	t_{90}	energy consumption		
	TESTS	W	°C	s	W·h	W·h / kg		s	W·h		
HOB 1G	Rep. 1	528	93,0	1937	514	343	no	676	333		
	Rep. 2	514	92,3	1926	505	336	no	665	323		
	Rep. 3	518	91,5	1942	511	341	no	682	328		
HOB 2G	Rep. 1	409	87,9	1930	469	312	no	671	327		
	Rep. 2	389	87,7	1994	497	332	no	734	356		
	Rep. 3	392	87,9	2019	496	331	no	759	362		
HOB 3G	Rep. 1	416	87,5	1877	435	290	no	617	297		
	Rep. 2	402	87,7	1858	443	296	no	599	305		
	Rep. 3	390	87,6	1865	444	296	no	605	308		
HOB 4G	Rep. 1	483	94,6	1910	479	319	no	654	314		
	Rep. 2	472	94,5	1907	474	316	no	649	312		
	Rep. 3	475	93,8	1932	476	318	no	676	314		

ELECTRICAL

HOB 5E	Rep. 1	225	89,4	1941	309	206	no	677	232
	Rep. 2	230	89,1	1884	306	204	no	624	227
	Rep. 3	230	90,1	1900	303	202	no	636	226
HOB 6E	Rep. 1	232	90,4	1754	287	192	no	490	209
	Rep. 2	233	91,5	1758	290	193	no	494	212
	Rep. 3	231	90,4	1756	283	189	no	489	205
HOB 7E	Rep. 1	206	89,3	1902	298 ^(M2)	198 ^(M2)	no	640	229
	Rep. 2	205	88,3	1916	297 ^(M2)	197 ^(M2)	no	653	228
	Rep. 3	203	88,6	1920	293 ^(M2)	194 ^(M2)	no	649	225
HOB 8E	Rep. 1	195	89,2	1684	293	195	yes	421	227
	Rep. 2	195	89,3	1682	295	197	yes	419	229
	Rep. 3	195	89,5	1684	293	195	yes	420	227

GAS		Pot: Ø150						Material: aluminium	
		SIMMERING						HEATING UP	
SAMPLE	Parameter	Average power	$\overline{T_s}$	$t_{90}+t_s$	E_{cw}	$\frac{E_{cw}}{m_{cw}}$	Water boils during test	t_{90}	energy consumption
	TESTS	W	°C	s	W·h	W·h / kg		s	W·h
HOB 1G	Rep. 1	454	93,8	1804	409	397	no	544	260
	Rep. 2	427	94,8	1829	412	400	no	570	267
	Rep. 3	405	94,6	1797	406	393	no	537	265
HOB 2G	Rep. 1	412	93,7	1869	449	437	no	610	305
	Rep. 2	407	92,0	1870	431	419	no	610	298
	Rep. 3	410	92,4	1910	445	432	no	650	313
HOB 3G	Rep. 1	387	91,1	1815	421	408	no	554	282
	Rep. 2	395	92,0	1776	407	396	no	516	264
	Rep. 3	388	91,8	1763	398	387	no	503	259
HOB 4G	Rep. 1	489	98,3	1769	412	400	no	508	249
	Rep. 2	485	97,0	1805	417	405	no	545	253
	Rep. 3	486	98,7	1801	421	408	no	542	257

ELECTRICAL

HOB 5E	Rep. 1	118	88,8	1673	199	194	yes	411	159
	Rep. 2	118	87,8	1651	201	195	yes	390	160
	Rep. 3	119	87,7	1637	204	198	yes	376	163
HOB 6E	Rep. 1	133	88,7	1649	220	214	no	384	175
	Rep. 2	125	87,8	1655	221	215	no	393	179
	Rep. 3	129	88,5	1652	221	215	no	390	177
HOB 7E	Rep. 1	140	88,8	1671	210 ^(M2)	205 ^(M2)	yes	410	163
	Rep. 2	141	87,9	1676	211 ^(M2)	205 ^(M2)	yes	410	163
	Rep. 3	141	89	1666	210 ^(M2)	204 ^(M2)	yes	403	163
HOB 8E	Rep. 1	195	94,8	1624	259	251	no	357	194
	Rep. 2	191	93,5	1625	259	251	no	362	195
	Rep. 3	192	93,7	1618	256	248	no	354	191

GAS		Frying pan: Ø180		
		SHALLOW FRYING		
SAMPLE	Parameter	t_{Fr}	Average power	E_{cw}
	TESTS	s	W	W·h
HOB 1G	Rep. 1	907	503	126
	Rep. 2	905	502	126
HOB 2G	Rep. 1	908	447	113
	Rep. 2	902	452	113
HOB 3G	Rep. 1	901	494	123
	Rep. 2	903	492	123
HOB 4G	Rep. 1	904	472	118
	Rep. 2	903	487	122

ELECTRICAL

HOB 5E	Rep. 1	904	281	71
	Rep. 2	903	287	72
HOB 6E	Rep. 1	905	136	58
	Rep. 2	939	144	61
HOB 7E	Rep. 1	903	217	55
	Rep. 2	910	217	57
HOB 8E	Rep. 1	910	233	62
	Rep. 2	936	231	61

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				EMISSIONS [only for gas appliances]							
CONFIGURATION				CO [mg/kWh]				% CO			
Tests	Setting	Cookware size	Cookware material	HOB 1G	HOB 2G	HOB 3G	HOB 4G	HOB 1G	HOB 2G	HOB 3G	HOB 4G
Config. 1	Maximum	Ø 180	Aluminium	43,0	21,5	204,1	247,0	0,004	0,002	0,019	0,023
			Stainless steel	43,0	21,5	279,2	279,2	0,004	0,002	0,026	0,026
Config. 2	Simmering	Ø 180	Aluminium	580,0	698,1	923,6	322,2	0,054	0,065	0,086	0,030
			Stainless steel	537,0	601,4	827,0	139,6	0,050	0,056	0,077	0,013
Config. 3	Maximum	Ø 150	Aluminium	43,0	21,5	118,1	128,9	0,004	0,002	0,011	0,012
			Stainless steel	32,2	21,5	182,6	354,4	0,003	0,002	0,017	0,033
Config. 4	Simmering	Ø 150	Aluminium	601,4	816,2	955,9	612,2	0,056	0,076	0,089	0,057
			Stainless steel	569,2	816,2	923,6	290,0	0,053	0,076	0,086	0,027
Config. 5	Frying	Ø 180	Frying pan	483,3	655,1	934,4	257,8	0,045	0,061	0,087	0,024

				EMISSIONS [only for gas appliances]			
CONFIGURATION				NOx [mg/kWh]			
Tests	Setting	Cookware size	Cookware material	HOB 1G	HOB 2G	HOB 3G	HOB 4G
Config. 1	Maximum	Ø 180	Aluminium	120,8	124,1	110,4	97,9
			Stainless steel	124,9	118,7	105,4	118,9
Config. 2	Simmering	Ø 180	Aluminium	76,6	74,1	63,1	76,2
			Stainless steel	86,8	79,3	70,0	73,9
Config. 3	Maximum	Ø 150	Aluminium	128,4	120,9	113,3	111,6
			Stainless steel	133,0	131,2	110,0	113,9
Config. 4	Simmering	Ø 150	Aluminium	82,5	77,7	70,3	76,5
			Stainless steel	97,1	78,8	69,1	84,7
Config. 5	Frying	Ø 180	Frying pan	78,4	87,1	59,4	84,0

				LOWER POWER MODES	
				Performance mode	Electrical power consumption
HOB 1G	GAS			Stand-by	< LOD
HOB 2G				Stand-by	< LOD
HOB 3G				Stand-by	< LOD
HOB 4G				Stand-by	< LOD

HOB 5E	ELECTRICAL			Stand-by	0,24 W
HOB 6E				Stand-by	0,34 W
HOB 7E				Stand-by	0,30 W
HOB 8E				Stand-by	< LOD

LOD = limit of detection of the measuring equipment: 0,01 W.

		LEAKTIGHTNESS [only for gas appliances]	
	Supply	Performance mode	CH ₄ LEAKAGE
HOB 1G	G 20 20 mbar	Stand-by	< LOD
HOB 2G		Stand-by	< LOD
HOB 3G		Stand-by	< LOD
HOB 4G		Stand-by	< LOD

LOD = limit of detection of the measuring equipment: 2 cm³/h (considering CH₄ at 0°C and 1013,25 mbar).

COOKWARE FLATNESS						
(mm)	Cookware	Stainless steel		Aluminium		Frying pan
	Repetition	Ø 180	Ø 150	Ø 180	Ø 150	Ø 180
Before tests	--	< LOD	< LOD	0,15	0,05	1,00
After simmering test	1	< LOD	< LOD	0,15	0,05	--
	2	< LOD	< LOD	0,15	0,05	--
	3	< LOD	< LOD	0,15	0,05	--
After frying tests	1	--	--	--	--	1,00
	2	--	--	--	--	1,00

COMMENTS

1. SIMMERING TEST

- The goal of this test is to arrive at the water temperature of 90 °C and maintain it for a certain time. To do it, the technician has to find the handle position of the appliance to adjust (reduce) the power setting that lets to get this condition.

There are different aspects to take into account that have a big influence over the repeatability/reproducibility of the test and over the temperature that can be reached around the target:

- The appliance handles can be with or without fixed positions,
- A very small movement on the handle leads to a great variation on the Ts,
- For continuous regulation controls (without fixed positions), the clearance of the handle movement and the difficulties to set the controls on the same position in every repetition could have a big impact in the result,
- The inertia from the maximum phase makes very difficult to get a Ts on 90°C (in the test method of the standard EN60350-2, there was a preliminary test to get 70°C; lower value, lower inertia),

Based on the previous comments, it was considered necessary to introduce a tolerance on the target temperature for this test.

It is possible that more than one setting fulfills the target temperature taking into account the tolerance; but in these cases, the lower setting has to be used.


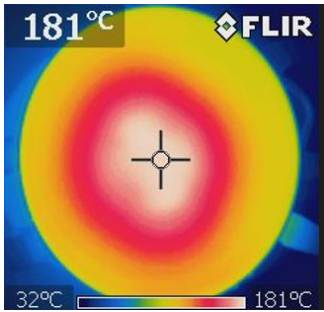
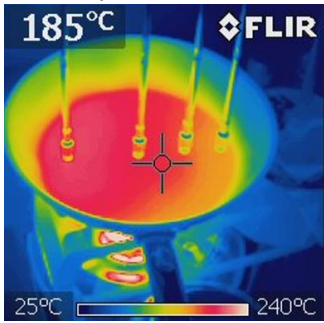
- As a result of thermal inertia of the system, water boils or local boiling points appear in some tests.
- The influence of big variations in ambient temperature has been verified. Therefore, it's important to maintain the current tolerance indicated in the DTMM.
- In gas appliances, it's possible that the difference between the declared heat input and the obtained in the laboratory has greater than 5% (limit stated in the standards). But this verification has not been carried out during the tests, and therefore, no adjustment has been made to the appliances (tested "out of the box").
- After finished the tests, the evaluation of the repetitions in each sample has showed that there has been a random variation on the water load with no influence over the results. It can be considered that the stated tolerance for this parameter has been correctly fixed.

2. HEATING UP TEST

- According test method, the heating up time could be got using data from simmering test. After performing the test protocol, this was verified.

- Temperature of cold water has an impact on heating up time. Taking into account the variation in the initial temperature and normalizing it by establishing a ΔT could improve the results.
- To avoid convection effects of water, smoothed temperature mean with a time base $T_{mov}=40$ was used as stated in EN 60350-2:2017.

3. SHALLOW FRYING TEST

<ul style="list-style-type: none"> Initially, it was considered the positioning the temperature sensors in a triangular figure distributed symmetrically on the base of the pan. 	<p>Sensor placement during pre-pilot test:</p> 
<p>After studying the heat distribution, a new positioning was decided due to different aspects have influence over the heat distribution:</p> <ul style="list-style-type: none"> - the heat source shape, - the position of the frying pan handle, - the grill shape 	<p>An example of heat distribution in a round heat source:</p> 
<p>The placement of the sensors used in this tests has been:</p> <ul style="list-style-type: none"> - perpendicular to the handle position - covering the diameter, each sensor in a different distance 	<p>An example of heat distribution in a non-symmetrical grill with the sensors placed:</p> 

- Similar circumstances to simmering test were found in this test, and the way to solve them was the same:
 - A tolerance was introduced to the target temperature (without this criteria was not possible to set a position of energy consumption specifically for those appliances having a continuous regulation).
 - For discrete setting controls, it is possible that more than one setting fulfills the target temperature taking into account the tolerance (the lower setting was used).

4. EMISSIONS

- All emissions parameters under analysis shall be sampled at the same time, sampling line materials influence shall be considered. CR1404:1994 was taken as a reference standard.
- Emissions were performed using the same cookware used on the rest of the test and using EN 30-1-1 hoods.
- In the case of frying pan where the test set-up was different: without water and with a different shape (including the long handle), several tests were carried out with hood and with the ring described in the standard EN 203-2-1. But, difficulties placing the sampling ring over the frying pan don't let to ensure a good repeatability of the test.
- It is important to avoid contact of steam from water boiling with flue products, due to some contaminants could be lost in condensation.

5. COOKWARE

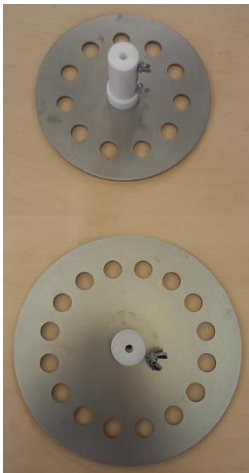


- The received frying pan fails flatness criteria stated in EN 60350-2:2017. It was tried to flatten it, but the resulting pan was deformed after first heating. The tests were done using the second sample of pan (as received).



6. TEST METHOD STATED IN THE STANDARD

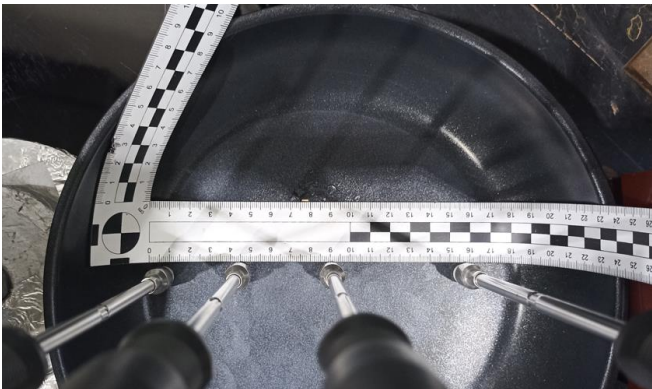

- As the changes on standard test method are very relevant, the tests have been carried out according to the DTMM. Standard is cited only as reference for specific clauses.
- Main changes applied in these tests:
 - For simmering test: the step to get the temperature of 70°C is removed
 - For combustion and emission tests: the tested configurations are different from the ones stated in the standard

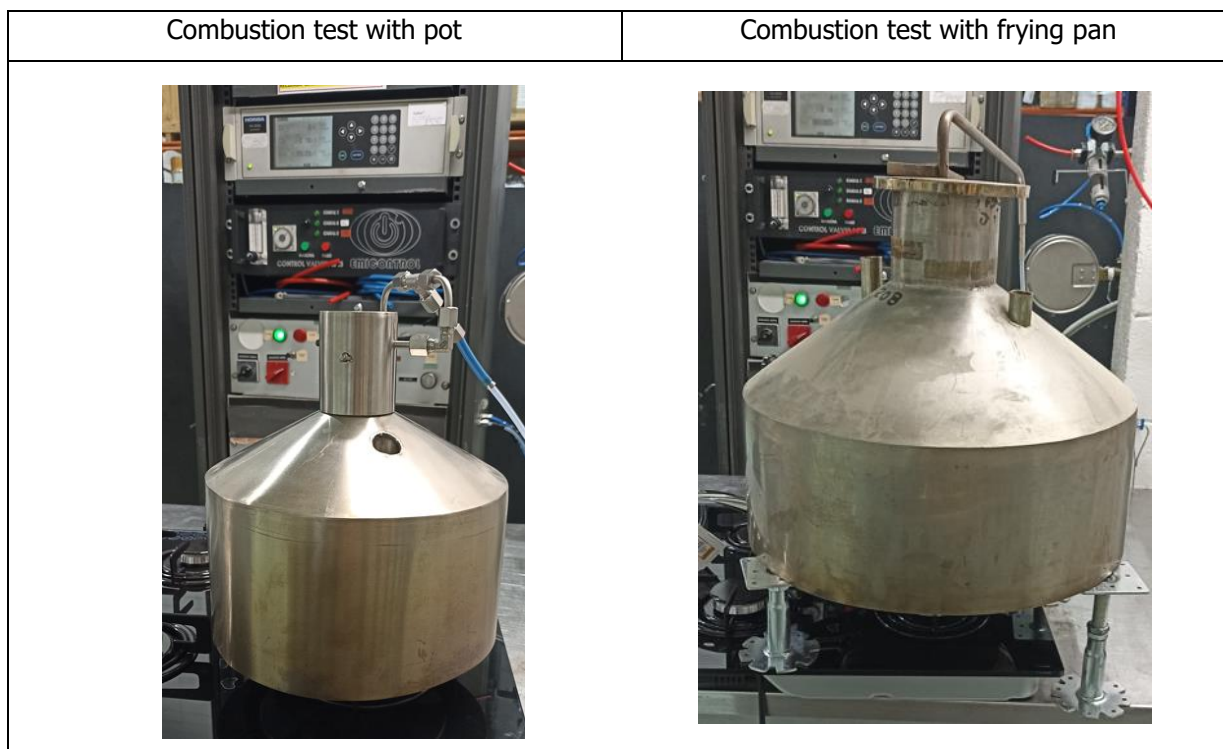
PICTURES

COOKWARE	
Stainless steel	
Aluminium	
Frying pan	

LIDS	MAGNET DISCS
 	

TEST RIG	
Simmering test	Flatness verification
	

Shallow frying test	
	



EQUIPMENT

Description	Brand / model	Used for measuring
Pressure sensor	Axiomatic mod. TPD 9000	Gas supply pressure
Thermohygrometer	Lascar mod. EL-SIE-6+	Ambient temperature
Combustion analyzer	HORIBA mod. VA3000	CO, CO ₂ , O ₂
Emissions analyzer	ENVIRONMENT T32	NO, NO _x
Data logger	PICO TECHNOLOGY mod. TC08	Surface temperature of pan
Power meter	CHROMA mod. 66202	Electrical power consumption
Coriolis flowmeter	Micro-motion ELITE CMFS007	Gas consumption
Leak test bench	SIERRA mod. M101	CH ₄ leakage
Scale	Mettler Toledo PBK 989-CC300 (30000e)	Mass of water
Temperature RTD sensor	RS AMIDATA 342-8978	Temperature of water
Flatness gauges	ACHA	Flatness of pans and magnets

MAIN EQUIPMENT



Emissions analyzer



Combustion analyzer



Power meter



Gas flowmeter

Signed by

Technical Manager of Gas Appliances & Boilers Laboratory

Product Conformity B.U.

LGAI Technological Center, S.A. (APPLUS+)

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