



2020-10-28

Mr. Jimmy Sandusky
Halton Co
103 Industrial Dr
Scottsville, KY, 42164-7932
US

E-mail: jimmy.sandusky@halton.com

Reference: Project : 4789265942 P.O. Number: N/A

Product: EPA 202 TEST METHOD: USING THE MOFFAT OVEN MODEL E35T6-26-P263
COOKING THE BELOW FOOD PRODUCT AS MEDIA.

Dear Mr. Sandusky,

Per your request, project 4789265942 was opened for the evaluation of grease-laden vapors produced from the Moffat oven Model E35T6-26-P263.

The scope of this project was to determine the total grease emissions from cooking quartered roasting chickens weighing 2-1/2 to 3-1/2 lb. skin-on and bone-in as the specified food load as noted in Appendix A. Testing is conducted in accordance with EPA Method 202 test guidelines to determine ultimate results. Results are used to determine compliance with Section 59 of UL710B, the Standard for Recirculating Systems, formerly Section 14 of UL 197, Eighth Edition, Supplement SB, and paragraph 4.1.1.2 of NFPA96, the Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations. The test was conducted at our facility in Northbrook, IL on October 20th, 2020. This letter will report the results of the EPA202 test.

For the record, the test was conducted using the Moffat, Model E35T6-26-P263, rated 208 V, 11.2 KW, 3 ph, 60 Hz. Model E35T6-26-P263 also considered representative of Moffat model E31, E32, and E33 since the models with rated less than 11.2 KW and they are smaller in size and has less food throughput. The test media, food load and oven programming as shown in Appendix A were taken from UL 710B, section 59. The results are considered to comply with UL710B, Section 59, formerly Section 14 of UL 197, Eighth Edition, Supplement SB, and NFPA96, paragraph 4.1.1.2 when tested with the specified food load and maximum cook times since the total amount of grease-laden effluents collected was 0.82 mg/m³, which is less than 5 mg/m³ limit. No evaluation was conducted in regards to fire protection.



UL LLC did not select the samples, determine whether the samples were representative of production samples or witness the production of the test samples, nor were we provided with information relative to the formulation or identification of component materials used in the test samples. The test results apply only to the actual samples tested.

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This letter will serve to report that all tests on the subject product have been completed. All information generated will be retained for future use. This concludes all work associated with EPA202 portion of the Project 4789265942 and we are therefore closing this portion of the project. Our Accounting Department has been instructed to bill you for all charges incurred.

Thank you for the opportunity to provide your company with these services. Please do not hesitate to contact us if you should have any questions or comments.

Very truly yours,

Reviewed by:

A handwritten signature in black ink that reads "Smit Thakkar".

A handwritten signature in black ink that reads "Fred Zaplatosch".

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APPENDIX: A



CLIENT INFORMATION	
Company Name	Halton Co
Address	101 Industrial Dr Scottsville, KY 42164

AUDIT INFORMATION:				
Description of Tests	Per Standard No.	UL 197	Edition/Revision Date	10 th 2020-07-10
		CSA C22.2 No. 109-17		3 rd 05/2017
		UL 710B		2 nd 2/1/2019
[X] Tests Conducted by ¹ KRZYSZTOF SROKA				
[X] UL Staff supervising UL Staff in training Leo Carrillo				

TESTS TO BE CONDUCTED:			
Test No.	Done ³	Test Name	<input type="checkbox"/> Comments/Parameters <input type="checkbox"/> Tests Conducted by ² <input type="checkbox"/> Link to separate data files ⁴
1	2020-10-06	POWER INPUT TEST (THREE PHASE): RATING (CSA 22.2 109-17):	
2	2020-10-20	CAPTURE TEST:	
3	2020-10-26	EMISSION TEST:	

Special Instructions -

[X] No general environmental conditions are specified in the Standard(s) or have been identified that could affect the test results or measurements.

RISK ANALYSIS RELATED TO TESTING PERFORMANCE:

The following types of risks have been identified. Take necessary precautions. This list is not all inclusive.

<input checked="" type="checkbox"/> Electric shock	<input type="checkbox"/> Radiation
<input checked="" type="checkbox"/> Energy related hazards	<input type="checkbox"/> Chemical hazards
<input checked="" type="checkbox"/> Fire	<input type="checkbox"/> Noise
<input checked="" type="checkbox"/> Heat related hazards	<input type="checkbox"/> Vibration
<input checked="" type="checkbox"/> Mechanical	<input type="checkbox"/> Other (Specify)___

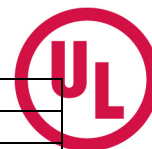
GENERAL TEST CONSIDERATIONS - ALL TESTS:

[Power Supply Connections]

Unless otherwise specified in the individual test methods, the appliance was connected to a [208] volt source of supply at [60] Hz.

This supply connection was based on

- The marked voltage rating
- The highest voltage of the applicable range of voltages



TEST LOCATION: (To be completed by Staff Conducting the Testing)					
<input checked="" type="checkbox"/> UL or Affiliate	<input type="checkbox"/> WTDP	<input type="checkbox"/> CTDP	<input type="checkbox"/> TPTDP	<input type="checkbox"/> TCP	<input type="checkbox"/> PPP
Company Name: UL LLC					
Address: 333 PFINGSTEN RD, NORTHBROOK IL 60062					

TEST EQUIPMENT INFORMATION

UL test equipment information is recorded on Meter Use.

TEST SAMPLE IDENTIFICATION:

The table below is provided to establish correlation of sample numbers to specific product related information. Refer to this table when a test identifies a test sample by "Sample No." only.

Sample Card No.	Date Received	<input type="checkbox"/> Test No.+	Sample No.	Manufacturer, Product Identification and Ratings
3272533	2020-08-28	All	1	Moffat, Electric Convection oven, Model E35T6-26-P263, rated 208 V, 3 ph, 11.2 kW
3272533-1	2020-09-10	All	2	Stand for Model E35
3297365-1	2020-09-10	All	3	Sheet Pans - 2/3 size

+ - If Test Number is used, the Test Number or Numbers the sample was used in must be identified on the data sheet pages or on the Data Sheet Package cover page.

Sampling Procedure -

This document contains data or information using color and if printed, should be printed in color to retain legibility and the information represented by the color.



POWER INPUT TEST (THREE PHASE):
RATING (CSA 22.2 109-17):

UL 197 Sec. 47
(6.2)

METHOD

The supply voltage was adjusted to voltage and frequency as noted in "General Test Considerations", [208 V], [60 Hz].

The supply voltage was adjusted to the [rated voltage] [mean of the rated voltage range] at rated frequency, [___ V], [___ Hz].

The power input was measured with the appliance at the intended operating temperature under full-load conditions.

(c-UL) - To determine the proper test voltage for the Temperature (Normal) and Temperature (Abnormal) tests, the supply voltage was adjusted to the increased test voltage as noted below. Following the test at increased test voltage, the supply voltage was adjusted to the value necessary to cause the appliance to draw the increased test [current] [and] [power], calculated as specified below.

Increased Test Voltage (V_t): 216V for appliances rated 208V.
250V for appliances rated between 220V-250V.

Increased Test Current (I_t): $I_r(V_t/V_r) = \underline{\hspace{2cm}}$ A

Increased Test Power (W_t): $W_r(V_t/V_r)^2 = \underline{12.1}$ (kW)

Where V_r , I_r , and W_r , are the rated voltage, current, and power of the appliance, respectively. Note: when the appliance is rated for a range of voltages, the mean of the range is to be used as V_r .

PARAMETERS

Appliance Ratings:

Volts: 208; Current: A; Power: 11.2 (kW)



POWER INPUT TEST (THREE PHASE): (CONT'D)
 RATING (CSA 22.2 109-M1981):

UL 197 Sec. 47
 (6.2)

RESULTS

Operating Conditions	Specified					Measured						
	Volts	Amps			Power, (W) (kW)	Volts			Amps			Power, (W) (kW)
		L1	L2	L3		L1-L2	L2-L3	L1-L3	L1	L2	L3	
Full power operation, rated voltage	208	---	---	---	---	208	209	209	32	32	33	11683
[x] Full power operation, rated power	---	---	---	---	11.2	204	205	205	32	32	32	11201
C-UL Operating Conditions												
Full power operation, increased test voltage	216	---	---	---	---	216	217	217	33	33	33	12433
[x] Full power operation, increased test power	---	---	---	---	12.1	213	214	214	33	33	33	12109

[] The input current [was] [was not] between 90% and 105% of the rated input current when the appliance was energized at rated voltage.

[x] The input power [was] [~~was not~~] between 90% and 105% of the rated input power when the appliance was energized at rated voltage.



CAPTURE TEST:

UL 710B Sec. 58

UL 710 Sec. 31

METHOD

The model E35T6-26-P263 cooking appliance was placed under a hood operating at 500 CFM. Food product as specified below was then used for testing, see Emission Testing for specific details. The cooking area is to be observed for the presence of visible smoke and grease-laden air, and the hood assembly shall completely capture all of the emission as determined by observation.

COOKING PRODUCT

- Other - As described in the Emission Test.
- For testing ovens, as an alternate, when chicken does not produce visible cooking smoke and grease laden air, one sheet pan (nominal pan size 18 by 26 inches) filled with 1 lb of pork bacon and coated with one cup of sugar distributed evenly is permitted to be used. The pan shall be placed at the lowest location (rack) of the oven, and the oven run at the maximum temperature for 10 minutes

COOKING METHOD

- [Other]
Quartered chickens weighing 2.5 - 3.5 lbs. The oven cavity was filled to the maximum capacity of 24 quartered chickens, and was cooked at 500°F for 8 hrs. 00 minutes.

RESULTS

Their ~~[was]~~ [was not] the presence of visible smoke and grease-laden air from the appliance during testing.

The sample [did] ~~[did not]~~ capture all of the emissions from the cooking appliance.

Note: Cook time is 27 minutes. No water connection, per Smit Thakkar no steam injection during testing. Total of 4 chickens per tray, a total of 6 trays per load.



METHOD

TEST FOR EVOLUTION OF SMOKE OR GREASE-LADEN AIR (500°F):

The model E35T6-26-P263 cooking appliance was placed under a hood operating at 500 CFM, and was tested using a method derived from EPA Method 202. The [Underwriters Laboratories] provided **the food load** for the test.

A 12 in. by 6 in. rectangular, 108 in. tall sheet metal stack was constructed on top of the hood. A sampling port was located approximately 80 in. downstream from the hood exhaust, at which point it was determined there was laminar flow. The sampler was assembled and an out of stack filter was used. A pre-leak check was conducted and determined to be < 0.02 ft/min. Sampling was determined to be done at 8 traverse points.

The oven was operated normally by cooking the following foods:

[Other]

Quartered chickens weighing 2.5 - 3.5 lbs. The oven cavity was filled to the maximum capacity of 24 quartered chickens, and was cooked at 500°F for 8 hrs. 00 minutes. Total 17 loads were cooked.

The cooking cycle was repeated for 8 hours of continuous cooking.

During the cooking operation, it was noted whether or not visible effluents evolved from the air exhaust of the hood. Gauge, meter and temperature readings were taken and recorded every 10 min. After cooking, the condition of the duct was noted and a post-leak check was conducted and determined to be < 0.02 ft³/min.



EMISSION TEST (CONT'D):

UL 710B Sec. 59

After being allowed to cool, the sampling equipment was disassembled. The glass-filter is to be removed using a pair of forceps and placed in a clean petri dish. The dish is to be sealed and labeled "SAMPLE 1".

A sample of the acetone of the same volume that will be used to rinse-out the nozzle and probe is to be placed into a clean sample bottle, sealed, and labeled "SAMPLE 2". The level of the liquid in the sample bottle is to be recorded.

The inside of the nozzle and probe is to be rinsed with acetone taking care to collect all the rinse material in a clean sample bottle. The sample bottle is to be sealed, labeled "SAMPLE 3", and the level of the liquid in the bottle is to be recorded.

The liquid in the first three impingers is to be measured and the total volume is to be recorded which will be compared to the original volume. The liquid is to be quantitatively transferred to a clean sample bottle. Each impinger and the connecting glassware including the probe extension are to be rinsed twice with water. The rinse water is to be collected and added to the same sample bottle. The sample bottle is to be sealed, labeled "SAMPLE 4" and the level of the liquid in the bottle is to be recorded.

This rinse process is to be repeated with two rinses of methylene chloride (MeCl_2). The rinses are to be recovered in a clean sample bottle. The sample bottle is to be sealed, labeled "SAMPLE 5" and the level of the liquid in the bottle is to be recorded.

A volume of water approximately equivalent to the volume of water used to rinse and a volume of MeCl_2 approximately equivalent to the volume of MeCl_2 used to rinse is to be placed in two clean sample bottles. The sample bottles are to be sealed, labeled "SAMPLE 6" and "SAMPLE 7" respectively, and the level of the liquid in the bottles is to be recorded.

The weight of the fourth impinger containing the silica gel is to be recorded and then the silica gel can be discarded.

The analysis phase was done in accordance with EPA Method 202, using the out of stack filter.

RESULTS

The results [are] [~~are not~~] considered acceptable because there [~~was~~] [was no] visible smoke emitted from the exhaust of the hood during the normal cooking operation. There [~~was~~] [was no] noticeable amounts of smoke accumulated in the test room after 8 hours of continuous cooking.

The total amount of grease-laden effluents collected by the sampling equipment was found to be 0.82 mg/m^3 , which is [less] [~~more~~] than 5 mg/m^3 .

The total grease emissions (per clause 78.2 of 710B) in pounds per hour per linear food of hood was $0.000390 \text{ lb/hr/ft}$.

Note: Stack avg humidity and temperature;

Stack temperature; 86°F

HUMIDITY INSIDE STACK; 44 %





CONDENSIBLE MATTER
(Lab Analysis)

Sample Bottle No.	Description	Volume, ml	Final Wt, mg
2	Acetone (Blank)	115.0	0.1
3	Acetone (Wash)	115.0	0.6
4&5	Solvent Phase (Wash)	200.0	3.0
4&5	Water Phase (Wash)	390.0+280.0=670.0	3.6
6&7	Solvent Phase (Blank)	200.0	0.9
6&7	Water Phase (Blank)	280.0	0.3

Filter paper weight before test- 598.6 mg

Filter paper weight after test- 599.5 mg

Analysis

1. The liquid level of all the sample bottles is to be measured.
2. The filter from sample ONE is to be removed and dried to constant weight by means of a desiccator or an oven. The weight of the filter is to be recorded.
3. The volume of sample TWO is to be determined. The liquid is then to be transferred to a beaker and evaporated to dryness. The volume of the liquid and the final weight of the condensable matter are to be recorded.
4. The volume of sample THREE is to be determined. The liquid is then to be transferred to a beaker and evaporated to dryness. The volume of the liquid and the final weight of the condensable matter are to be recorded.
5. The volumes of sample FOUR and FIVE are to be measured.
6. Samples FOUR and FIVE are to be combined. The solvent phase is to be mixed, separated, and then repeated with two MeCl_2 washes.
7. The solvent extracts obtained from the procedure in 6 are to be placed in a beaker and evaporated to a constant weight. The final weight is to be recorded.
8. The water phase is to be placed in a beaker and evaporated to dryness. The final weight is to be recorded.
9. The volumes of samples SIX and SEVEN are to be determined. Sample bottles SIX and SEVEN are to be analyzed according to procedures 8 and 7 respectively.