

2023-11-22



Mr. Rob Patton
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Mentor, OH 44060
United States

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Reference: Project: 4786532328 P.O. Number: C FISHER 8/6/14

Product: EPA 202 TEST METHOD: USING THE MODEL RO151FUA, RATED 480 V, 3 phase, 12KW WITH HUMIDITY, COOKING THE BELOW FOOD PRODUCTS AS MEDIA.

Dear Mr. Patton,

This letter will update our letter dated November 24, 2014 to CresCors' Mr. Chad Fisher.

Per your request, project 4786532328 was opened for the evaluation of grease-laden vapors produced from quartered, 2-1/2 to 3-1/2 skin-on and bone-in roasting chicken in the model RO151FUA Quicktherm rethermalizer, rated 480 V, 3 phase, 12kW. Each chicken load was placed on twelve 18 X 26 in. pans. The subject rethermalizer was used to represent other Cook and Hold, Roast and Hold and Retherm models as indicated in this letter. Rethermalizers are not intended to cook and to be placed under a hood, however due to higher capacity and throughput the subject rethermalizer was used for representation purposes.

The scope of this project was to determine the total grease emissions from cooking quartered chicken 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 November 13th, 2014. This letter will report the results of the EPA202 test.

For the record, the test was conducted using a Cres Cor, Quicktherm rethermalizer, Model RO151FUA, rated 480 V, 3 phase, 12kW with humidity. The test media as shown in Appendix A was specified by Cres Cor. The unit parameters including humidity, temperature and food load volume were determined by Cres Cor. The number of cycles was determined by using the FDA guideline of 165°F as safe cooking temperature for chicken. 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 your specified food load and requested cook times since the total amount of grease-laden effluents collected was 0.17 mg/m³, which is less than 5 mg/m³ limit. No evaluation was conducted in regards to fire protection. In addition, no evaluation of the rethermalizer itself was conducted.



The following models were also deemed to comply with UL710B, Section 59, formerly Section 14 of UL 197, Eighth Edition, Supplement SB, and NFPA96, paragraph 4.1.1.2 as the food load was cooked in the Model RO151FUA which was a higher capacity and throughput model:

Model Family	Model
Cook and Hold	1000CH (2 compartments)
	1000CH split
	750CH
	767
	500CH
	1000CH split
	750CH
	767
	500CH
	Rethermalizers
RO151FUA cabinets	
RO151F13 cabinets	
RO151FUA cabinets	
RO151H13 cabinets	
RO151HUA cabinets	
RO151X13 cabinets	
RO151XUA cabinets	
Roast and Hold	CO151F13 cabinets
	CO151FUA cabinets
	CO151H13 cabinets
	CO151HUA cabinets
	CO151X13 cabinets
	CO151XUA cabinets
	CO151X13 cabinets
	CO151XUA cabinets



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 Project 4786302400 and we are therefore closing this 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:

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APPENDIX: A

CLIENT INFORMATION	
Company Name	CRES COR
Address	5925 Heisley Rd Mentor, OH 44060-1833

AUDIT INFORMATION:				
Description of Tests	Per Standard No.	UL 710B CSA C22.2 No. 109 UL 300	Edition/ Revision Date	2 nd 2014-02-28 M1981 R2013 3 rd 2010-7-16
<input checked="" type="checkbox"/> Tests Conducted by	_____		Leo Carrillo	
+	Printed Name	Signature		
<input type="checkbox"/> [1] UL Staff supervising	_____		_____	
UL Staff in training	Printed Name	Signature		
Reviewed and accepted by qualified Project Handler	Sean Drobinski	Sean Drobinski		Signature
	Printed Name	Signature		

TESTS TO BE CONDUCTED:				
Test No.	Start	Done	Test Name	Comments/Parameters Tests Conducted by
1	2014-11-12	2014-11-12	POWER INPUT TEST (THREE PHASE): RATING (CSA 22.2 109-M1981):	
2	2014-11-12	2014-11-20	CAPTURE TEST:	
3	2014-11-14	2014-11-20	EMISSION TEST:	

Special Instructions -

[] Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be recorded at the time the test is conducted.

Ambient Temperature, C ± Relative Humidity, % ± Barometric Pressure, mBar ±

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"/> [1] Radiation
<input checked="" type="checkbox"/> Energy related hazards	<input type="checkbox"/> [1] Chemical hazards
<input type="checkbox"/> [1] Fire	<input type="checkbox"/> [1] Noise
<input checked="" type="checkbox"/> Heat related hazards	<input type="checkbox"/> [] Vibration
<input type="checkbox"/> Mechanical	<input type="checkbox"/> [1] Other (Specify)_

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

UL 710B Sec. 44
 (6.2)

METHOD

[x] The supply voltage was adjusted to voltage and frequency as noted in "General Test Considerations", 480V, 3ph.

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

PARAMETERS

Appliance Ratings:

Volts: 480V 3 phase; Current: - A; Power: 12KW

RESULTS

Operating Conditions	Rated					Measured						
	Volts	Amps			Power, (W)	Volts			Amps			Power, (KW)
		L1	L2	L3		L1-L2	L2-L3	L1-L3	L1	L2	L3	
Full power operation, rated voltage	480	---	---	---	---	480	480	481	14.7	14.4	15.8	12.5
[] Full power operation, rated current	---				---							
[x] Full power operation, rated power	---	---	---	---	12000	474	474	475	14.5	14.2	15.6	12.15

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



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
	<input type="checkbox"/> WMT	<input type="checkbox"/> TMP	<input type="checkbox"/> SMT		
Company Name: UL LLC					
Address: 333 Pfingsten Rd. Northbrook, IL 60062					

TEST EQUIPMENT INFORMATION

[X] UL test equipment information is recorded on Meter Use in UL's Laboratory Project Management (LPM) database.

Inst. ID No.	Instrument Type	Test Number+, Test Title or Conditioning	Function /Range	Last Cal. Date	Next Cal. Date

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

The following additional information is required when using client's or rented equipment, or when a UL ID Number for an instrument number is not used. The Inst. ID No. below corresponds to the Inst. ID No. above.

Inst. ID No.	Make/Model/Serial Number/Asset No.

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
1989137	2014-11-03	all	2	Crescor, Rethermalizer, Model R0151FUA, 12KW/480V/with humidity(used with twelve 18 X 26 in. shelves)
1994882	2014-11-11	All	3	12 pans



CAPTURE TEST:

UL 710B Sec. 58
Also reference UL
710 Sec. 31

METHOD

The Model RO151FUA cooking appliance was placed under a hood, located in a draft free room and is operated at the lower air flow limit. 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.

The test shall be conducted by loading the maximum amount of the food products noted below, on or in the cooking appliance and cooking the food product until it is overcooked (very well done) as follows. The cooking cycle is to be repeated at least once.

- a. Deep fat fryers are to be tested with fries,
- b. Pressure deep fat fryers are to be tested with chicken pieces,
- c. Griddles, broilers and similar appliances are to be tested with meat cakes,
- d. Ovens, roasters and similar appliances are to be tested roasting chickens, and
- e. Other appliances are to be tested using the food product(s) for which they are designed.

When one of the appliances specified in (a) - (d) is not intended for cooking the specified food (for example, donut fryers), the appliance is to be tested using the food product for which the appliance is designed.

When the device and cooking process do not produce visible cooking smoke and grease laden air, a smoke generator is to be used and positioned in the cooking area to establish a more visible means for conducting this test.

COOKING PRODUCT

[x] Chicken Pieces - Frozen, unbreaded chicken pieces - Chickens - 2-1/2 to 3-1/2 lb skin-on and bone-in roasting chickens, loaded per manufacturer's instructions.

COOKING METHOD

Whole chickens weighing an average of 3.1 lbs. The oven was filled to the maximum capacity of 60 chickens (quartered), and was cooked at the manufactures specifications. This is considered one cycle. Note: Chickens were quartered prior to testing.

Note: 50 minutes cook time for chicken, 60 total chicken cooked. And it took 3 minutes and 10 sec for emptying and refilling cabinet. L.C 2014-11-13

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. The appliance is to be observed for the presence of visible smoke and grease laden air escaping from the hood assembly through the discharge port or through external seams, joints, penetrations, and that portion of the hood that captures grease laden vapors.



EMISSION TEST:

UL 710B Sec. 59

METHOD

TEST FOR EVOLUTION OF SMOKE OR GREASE-LADEN AIR (350_°F):

The model R0151FUA cooking appliance was placed under the hood operating at the lower airflow limit, and is tested using a method derived from EPA Method 202. The UL also provided the chicken for the test.

A 12 in. by 6 in. rectangular, 108 in. tall sheet metal stack was constructed on top of the hood and mounted above the exhaust vent 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:

Chicken Pieces - Frozen, unbreaded chicken pieces - Chickens - 2-1/2 to 3-1/2 lb skin-on and bone-in roasting chickens, loaded per manufacturer's instructions

The cooking cycle was repeated for 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 7108 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 0.17 mg/m³, which is **[less]** ~~[more]~~ than 5 mg/m³.

The total grease emissions (per clause 78.2 of 7108) in pounds per hour per linear food of hood was 0.000099 lb/hr/ft.

CONDENSIBLE MATTER
(Lab Analysis)

Sample Bottle No.	Description	Volume, ml	Final Wt, mg
2	Acetone (Blank)	107.0	0.4
3	Acetone (Wash)	98.0	0.3
4&5	Solvent Phase (Wash)	260.0	1.0
4&5	Water Phase (Wash)	570.0	1.9
6&7	Solvent Phase (Blank)	270.0	0.5
6&7	Water Phase (Blank)	560.0	1.0

Filter paper weight before test- 594.7 mg
Filter paper weight after test- 595.0 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 MeCl₂ 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.