



Food Service Technology Center Appliance Test Summary Report

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Manufacturer	Vulcan
Model	VSX9000
Appliance	Single Compartment 3-Pan Steamer - Electric

Report Number	5012.09.50
Test Date	November, 2009
Tested By	A.Spitz

Purpose of Testing

This testing determined the energy input rate, preheat time and energy, idle energy rate, uniformity and heavy/light-load cooking-energy efficiency of the steamer by applying ASTM F1484-05.

Energy Input Rate

Test Voltage (V)	208
Rated Energy Input Rate (kW)	7.5
Measured Energy Input Rate (kW)	7.8
Difference (%)	3.8

Preheat to 210°F

Duration (min)	7.42
Energy Consumption (kWh)	0.76

Idle at 212°F

Average Cavity Temperature (°F)	126
Idle Energy Rate (kW)	0.10



Red Potato Cooking Energy Efficiency and Production Capacity Test Results

Load ^a	Heavy Load	Light Load
Number of Pans	3	1
Cook Time (min)	20.61	19.28
Total Energy Consumed (kWh)	2.64	2.49
Energy to Food (Btu/lb)	108	107
Energy to Steamer (Btu/lb)	375	1,062
Cooking Energy Rate (kW)	7.69	7.74
Cooking Energy Efficiency (%)	30.0 ± 0.5	10.5 ± 0.5
Production Capacity (lb/h)	69.9 ± 3.1	24.9 ± 1.7
Water Consumption Rate (gph)	14.2	13.3

^a Each Load is based on a minimum average of three test replicates.

Vulcan

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Baltimore, MD. 21222
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Frozen Green Pea Cooking Energy Efficiency and Production Capacity Test Results

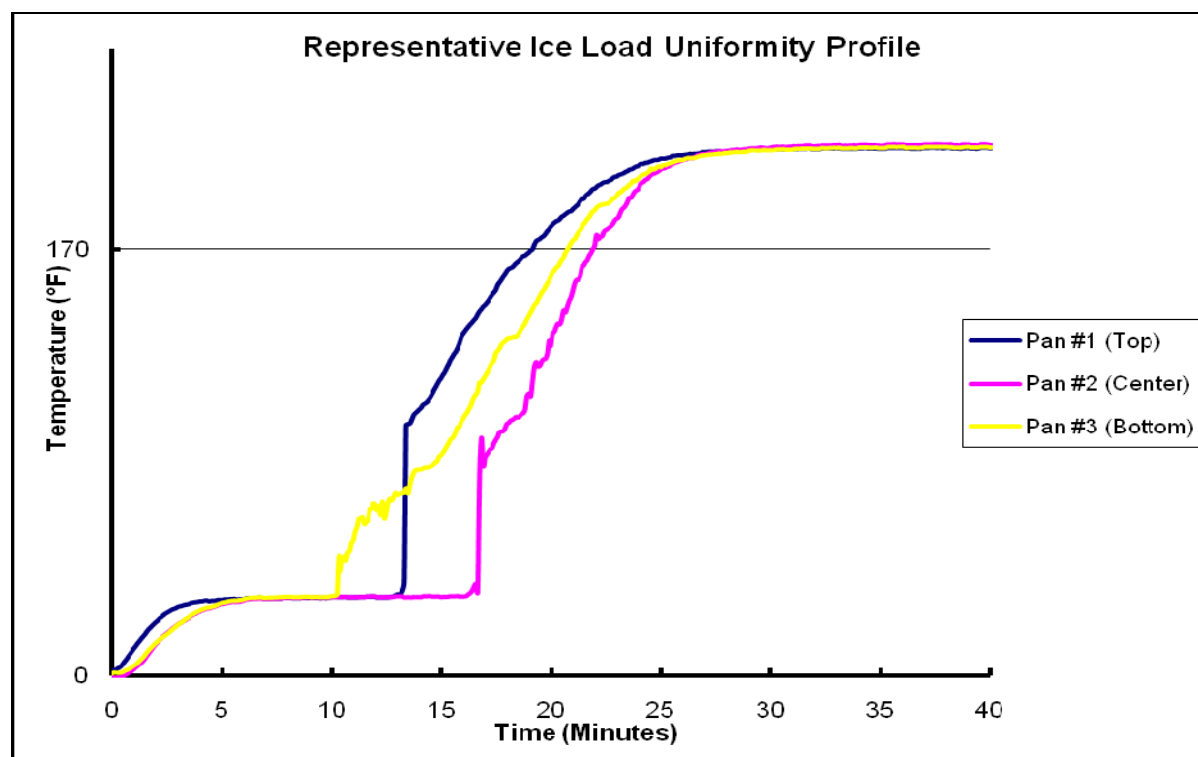
Load ^a	Heavy Load	Light Load
Number of Pans	3	1
Cook Time (min)	18.08	9.50
Total Energy Consumed (kWh)	2.31	1.20
Energy to Food (Btu/lb)	259	258
Energy to Steamer (Btu/lb)	329	512
Cooking Energy Rate (kW)	7.68	7.58
Cooking Energy Efficiency (%)	80.8 ± 2.2	51.7 ± 2.3
Production Capacity (lb/h)	79.6 ± 1.6	50.5 ± 2.2
Water Consumption Rate (gph)	41.2	41.2

^a Each Load is based on a minimum average of three test replicates.

Ice Load Uniformity Test Results

Load ^a	Heavy Load
Number of Pans	3
Cook Time (min)	21.00
Average Initial Ice-Load Temperature (°F)	2.9
Average Final Ice Load Temperatures (°F)	183.4
Pan #1 (Top)	194.3
Pan #2 (Middle)	170.8
Pan #3 (Bottom)	185.1

^a Each Load is based on a minimum average of three test replicates.



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Heavy-Load Red Potato Data

	Run #1	Run #2	Run #3
Measured Values			
Number of Pans	3	3	3
Cook Time (min)	20.25	20.58	21.00
Electric Energy Consumed (kWh)	2.62	2.64	2.66
Temperature of Uncooked Potatoes (°F)	71.2	70.8	71.1
Temperature of Cooked Potatoes (°F)	195.1	195.1	195.0
Weight of Stainless Steel Pans (lbs)	8.03	8.03	8.03
Weight of Potatoes (lbs)	24.02	23.98	24.04
Total Potato Count	150	150	150
Moisture Content (%)	84	84	84
Condensate Temperature (°F)	129.4	129.4	129.4
Water Consumption (gal)	13.9	14.2	14.5
Calculated Values			
Moisture Weight in Potatoes (lbs)	20.20	20.20	20.20
Average Weight of Each Potato (lbs)	0.16	0.16	0.16
Energy Consumed by Potatoes (Btu)	2,590	2,595	2,592
Energy to Food (Btu/lb)	108	108	108
Energy Consumed by Pans (Btu)	109	110	109
Energy of Boiler re-init (Btu)	n/a	n/a	n/a
Energy Consumed by the Steamer (Btu)	8,940	9,008	9,076
Energy to Steamer (Btu/lb of food cooked)	372	376	378
Cooking Energy Rate (kW)	7.76	7.70	7.60
Production Capacity (lb/h)	71.2	69.9	68.7
Energy Efficiency (%)	30.2	30.0	29.8

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Light-Load Red Potato Data

	Run #1	Run #2	Run #3
Measured Values			
Number of Pans	1	1	1
Cook Time (min)	18.67	19.67	19.50
Electric Energy Consumed (kWh)	2.48	2.46	2.52
Temperature of Uncooked Potatoes (°F)	71.1	71.8	73.4
Temperature of Cooked Potatoes (°F)	195.0	195.0	195.0
Weight of Stainless Steel Pans (lbs)	2.43	2.79	2.79
Weight of Potatoes (lbs)	7.99	7.99	8.00
Total Potato Count	50	50	50
Moisture Content (%)	84	84	84
Condensate Temperature (°F)	129.4	129.4	129.4
Water Consumption (gal)	12.9	13.5	13.4
Calculated Values			
Moisture Weight in Potatoes (lbs)	6.71	6.71	6.72
Average Weight of Each Potato (lbs)	0.16	0.16	0.16
Energy Consumed by Potatoes (Btu)	861	856	847
Energy to Food (Btu/lb)	108	107	106
Energy Consumed by Pans (Btu)	33.1	37.8	37.3
Energy of Boiler re-init (Btu)	n/a	n/a	n/a
Energy Consumed by the Steamer (Btu)	8,462	8,394	8,599
Energy to Steamer (Btu/lb of food cooked)	1,059	1,051	1,075
Cooking Energy Rate (kW)	7.97	7.51	7.75
Production Rate (lb/h)	25.7	24.4	24.6
Energy Efficiency (%)	10.6	10.7	10.3

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Heavy-Load Frozen Green Peas Data

	Run #1	Run #2	Run #3
Measured Values			
Number of Pans	3	3	3
Cook Time (min)	18.25	18.00	18.00
Electric Energy Consumed (kWh)	2.30	2.32	2.32
Initial Water Temperature (°F)	66.3	64.5	65.6
Final Water Temperature (°F)	113.6	111.1	112.9
Frozen Food Temperature (°F)	-1.9	-0.4	-3.2
Weight of Empty Calorimeter (lbs)	40.08	40.08	40.08
Weight of Full Calorimeter (lbs)	94.33	94.43	94.44
Weight of Calorimeter Water (lbs)	30.00	30.00	30.00
Weight of Cooked Food (lbs)	24.25	24.35	24.36
Weight of Frozen Food (lbs)	24.00	24.00	24.00
Weight of Stainless Steel Pans (lbs)	8.03	8.03	8.03
Moisture Content (%)	81	81	81
Condensate Temperature (°F)	n/a	n/a	n/a
Water Consumption (gal)	12.5	12.5	12.3
Calculated Values			
Moisture Weight in Green Peas (lbs)	19.44	19.44	19.44
Final Food Temperature (°F)	183.3	179.5	182.3
Energy Consumed by Green Peas (Btu)	6,239	6,157	6,245
Energy to Food (Btu/lb)	260	257	260
Energy Consumed by Pans (Btu)	164	159	164
Energy of Boiler re-init (Btu)	n/a	n/a	n/a
Energy Consumed by the Steamer (Btu)	7,850	7,916	7,918
Energy to Steamer (Btu/lb of food cooked)	327	330	330
Cooking Energy Rate (kW)	7.56	7.73	7.73
Productivity (lb/h)	78.9	80.0	80.0
Energy Efficiency (%)	81.6	79.8	80.9

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Light-Load Frozen Green Peas Data

	Run #1	Run #2	Run #3
Measured Values			
Number of Pans	1	1	1
Cook Time (min)	9.50	9.50	9.50
Electric Energy Consumed (kWh)	1.20	1.18	1.22
Initial Water Temperature (°F)	66.5	64.6	65.9
Final Water Temperature (°F)	113.5	112.0	112.5
Frozen Food Temperature (°F)	5.0	-0.1	-1.8
Weight of Empty Calorimeter (lbs)	40.08	40.08	40.08
Weight of Full Calorimeter (lbs)	58.18	58.22	58.20
Weight of Calorimeter Water (lbs)	10.00	10.00	10.00
Weight of Cooked Food (lbs)	8.10	8.14	8.12
Weight of Frozen Food (lbs)	8.00	8.00	8.00
Weight of Stainless Steel Pans (lbs)	2.40	2.79	2.79
Moisture Content (%)	81	81	81
Condensate Temperature (°F)	n/a	n/a	n/a
Water Consumption (gal)	6.5	6.5	6.7
Calculated Values			
Moisture Weight in Green Peas (lbs)	6.48	6.48	6.48
Final Food Temperature (°F)	182.5	181.3	180.8
Energy Consumed by Green Peas (Btu)	2,053	2,067	2,067
Energy to Food (Btu/lb)	257	258	258
Energy Consumed by Pans (Btu)	47	56	56
Energy of Boiler re-init (Btu)	n/a	n/a	n/a
Energy Consumed by the Steamer (Btu)	4,096	4,026	4,164
Energy to Steamer (Btu/lb of food cooked)	512	503	520
Cooking Energy Rate (kW)	7.58	7.45	7.71
Production Rate (lb/h)	50.5	50.5	50.5
Energy Efficiency (%)	51.3	52.7	51.0

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