

Larger Electric Pressure Cookers; Are they a possibility for institutions such as schools?

Test runs and commentary on three 'larger' EPCS..

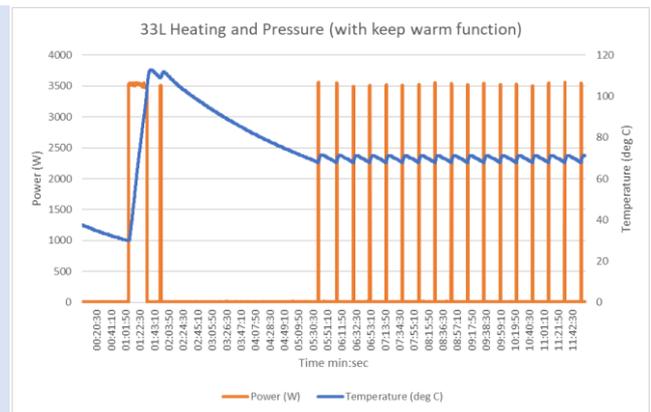
It has been proposed that larger EPCs, above 30 litre capacity, may find use in institutions such as **schools, clinics, food based small businesses and community institutions**. They may also have a role in **humanitarian community feeding programmes**.

This brief summarise tests performed on three samples:- a 33 litre capacity (33L) and 65 litre capacity (65L) from the Zhongshan HanHong Electrical Appliance Co Ltd and a 40 litre (40L) capacity EPC from Foshan Shunde Ewant Electrical technology Ltd. A fuller working paper is available.

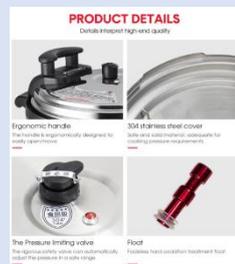


(Credit: Zhongshan HanHong Electrical Appliance Co Ltd)

Three devices were tested by following as closely as possible the protocol from the recently published 2020 Global LEAP Awards on domestic Electric Pressure Cookers. These appliances operate on single phase alternating current (AC), although since the 40L and 65L operate at 4kw and 6kw respectively they need appropriate wiring and fuses for 20 and 30 amps. The unit behaves as one would expect, heating constantly until pressure is reached, **then self-switching off based on a pressure switch**, returning to heat occasionally to maintain pressure. It also has a **keep warm function**.



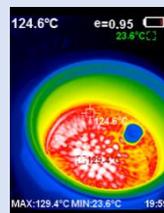
The lids have 2 locking pins preventing opening of the unit during the pressure phase. All three also have safety weighted valves and thermal fuse.



An air gap provides good insulation for cooking during the pressure phase. The lid is not insulated and becomes too hot to touch the surface, but the handles remain cool.



The unit can fry onions and cook with an open lid at 120+ degrees C. It has a lid sensor and can only cook without the lid on this 'open lid' or Sauté setting.



Its efficiency and cost per capita meal is of the same order as domestic AC EPCs when all devices are full but is half the cost when devices are half full (at an assumed tariff).



As a larger energy efficient appliance these are a very welcome addition to the toolkit of possibilities for pivoting populations towards clean modern energy cooking services. They all present as energy efficient appliances that utilise pressure cooking to reduce cooking times for 'long cook' foods such as beans.

SPECIFICATIONS	
Capacity (L)	33 litres
Nominal Voltage & Frequency (V / Hz)	220V AC/50Hz
Company Zhongshan HanHong Electrical Appliance Co Ltd	





TEST RESULTS		
Heating Phase	Total Energy Consumption (Wh)	1432
	Average Power Draw (W)	3550
	Thermal Efficiency (from 30-90°C)	92%
	Temperature: Max (°C)	112
	Time to Reach Pressure Cooking Phase (min:sec)	24
Pressure Cooking	Total Energy Consumption (for 30 min; Wh)	104
	Average Power Draw (W)	242
	Temperature: Max / Min / Ave (°C)	112/108/110
	Pressure: Max / Min / Ave (kPa)	Not measured
	Saute Cooking	Calculated Total Energy Consumption (for 20 min; Wh)
	Average Power Draw (W)	1285
	Temperature: Max / Min / Ave (°C) 1	145/128/139
	Temperature Stability (% time in ideal range)	low
	Time to Reach Sauté Temperature (min:sec)	320
Affordability*	Unit Price (\$-\$\$\$\$)	\$\$
	Estimated Annual Operating Cost (at USD\$0.20/kWh)	140
	Estimate cost per capita assumed 0.3 litre per person to cook 365 meals (at USD\$0.2/kWh)	2.53

Summary of 33 Litre Appliance

SPECIFICATIONS	
Capacity (L)	65 litres
Nominal Voltage & Frequency (V / Hz)	220V AC/50Hz
Company Zhongshan HanHong Electrical Appliance Co Ltd	





TEST RESULTS		
Heating Phase	Total Energy Consumption (Wh)	3703
	Average Power Draw (W)	5847
	Thermal Efficiency (from 30-90°C)	80.5%
	Temperature: Max (°C)	103
	Time to Reach Pressure Cooking Phase (min:sec)	38
Pressure Cooking	Total Energy Consumption (for 30 min; Wh)	119
	Average Power Draw (W)	188
	Temperature: Max / Min / Ave (°C)	103/101/102
	Pressure: Max / Min / Ave (kPa)	Not measured
	Saute Cooking	Calculated Total Energy Consumption (for 20 min; Wh)
	Average Power Draw (W)	2828
	Temperature: Max / Min / Ave (°C) 1	128/118/123
	Temperature Stability (% time in ideal range)	
	Time to Reach Sauté Temperature (min:sec)	660
Affordability	Unit Price (\$-\$\$\$\$)	\$\$\$\$
	Estimated Annual Operating Cost (at USD\$0.20/kWh)	374
	Estimate cost per capita assumed 0.3 litre per person to cook 365 meals (at USD\$0.2/kWh)	3.4

Summary of 65 Litre Appliance

SPECIFICATIONS	
Capacity (L)	40 litres
Nominal Voltage & Frequency (V / Hz)	220V AC/50Hz
Company Foshan Shunde Ewant Electrical technology Ltd	



TEST RESULTS		
Heating Phase	Total Energy Consumption (Wh)	1818
	Average Power Draw (W)	4195
	Thermal Efficiency (from 30-90°C)	87%
	Temperature: Max (°C)	111
	Time to Reach Pressure Cooking Phase (min:sec)	26
Pressure Cooking	Total Energy Consumption (for 30 min; Wh)	197
	Average Power Draw (W)	375
	Temperature: Max / Min / Ave (°C)	111/107/110
	Pressure: Max / Min / Ave (kPa)	Not measured
	Saute Cooking	Calculated Total Energy Consumption (for 20 min; Wh)
	Average Power Draw (W)	1448
	Temperature: Max / Min / Ave (°C) 1	122/118/120
	Temperature Stability (% time in ideal range)	null
	Time to Reach Sauté Temperature (min:sec)	330
Affordability	Unit Price (\$-\$\$\$\$)	\$\$
	Estimated Annual Operating Cost (at USD\$0.20/kWh)	182
	Estimate cost per capita assumed 0.3 litre per person to cook 365 meals (at USD\$0.2/kWh)	2.73

Summary of 40 Litre Appliance

This material has been funded by UK Aid from the UK government; however the views expressed do not necessarily reflect the UK government's official policies. The report makes no claims and warranties about the safety, quality, energy performance, or appropriateness of any product. The product is provided and listed "as is" without warranty of any kind, whether express, implied, statutory, or otherwise. The authors bear no liability for any damages resulting from use (or attempted use) of the product. The inclusion in this working paper of a manufacturer's product should not be construed as an endorsement of that manufacturer or of its entire product line, nor of the product safety. We have made every effort to provide transparent and accurate testing results for the product performance metrics included. The performance data included here is the result of testing a sample product samples. Product performance may vary based on different product configuration, test environments or other factors. Products were tested in "as shipped" mode. Data used here should only serve as an indication of product performance. Bulk purchasers considering appliance products are strongly encouraged to request detailed test results from manufacturers and/or conduct independent testing