

VACUUM-SEALING AND PACKAGING MACHINES FOR FOOD SERVICE APPLICATIONS FIELD TEST

ET10SCE1450



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Southern California Edison's Design & Engineering Services (DES) group is responsible for this project. It was developed as part of Southern California Edison's Emerging Technologies Program under internal project number ET10SCE1450. DES Project Managers Brian James and Carlos Haiad conducted this technology evaluation with overall guidance and management from Emerging Technologies Assessment Manager Paul Delaney. For more information on this project, contact: brian.james@sce.com.

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ABBREVIATIONS AND ACRONYMS

°F	Degrees Fahrenheit
DES	Design and Engineering Services
FTC	Foodservice Technology Center
kW	Kilowatt
kWh	Kilowatt-hour
SCE	Southern California Edison
W	Watts

INTRODUCTION

Southern California Edison's (SCE) Design and Engineering Services (DES) organization conducted this study in collaboration with SCE's Foodservice Technology Center (FTC). This field study assesses the energy savings and demand reduction potential of vacuum-sealing and packaging machines installed in The Kroger Company's Ralph's and Food4Less supermarkets.

ASSESSMENT OBJECTIVES

This study seeks to assess the energy consumption of the new, on-demand package sealers and calculate the associated energy savings compared to the baseline package sealers currently deployed in stores. The measured energy savings will help determine the potential for replacement of the existing package sealers.

PRODUCT ASSESSED

The baseline package sealer consists of a heating bar and a larger heating element, rated at approximately 50 watts (W) and 0.55 kilowatts (kW), respectively. The heating bar is used to cut the wrapping film as it comes in contact with the heating bar. The larger heating element is used to heat up the wrapping film. When the wrapping film is heated, the film sticks to a package and seal the product. With the conventional package sealer, both heating elements are controlled to keep a constant temperature of 280°F. The conventional package sealers came in two styles, a stand-alone unit and a table-top unit. Food4Less stores also had Hobart branded package sealers and Ralph's had Heat Seal branded package sealers. The different configurations and brands were all tested for the baseline. The new on-demand package sealer possess a similar heating bar and larger heating element set-up. However, the larger heating element for the on-demand unit is rated at approximately 2 kW. The functionality of the baseline and on-demand system is the same. Controls on the new unit allow the heating element to turn on only when the heating element is pushed down. Applying pressure to the heating element engages a switch, which activates the 2 kW heating element until the switch is disengaged, or for a maximum of 3 seconds. Figure 1 and Figure 2 display the conventional package sealer and on-demand package sealer, respectively. Please refer to the specification sheets in the appendices for more details.



FIGURE 1. CONVENTIONAL PACKAGE SEALER



FIGURE 2. ON-DEMAND PACKAGE SEALER

The incremental cost of the baseline package sealers and new on demand package sealers are estimated to be around \$325.

TEST METHODOLOGY

Kroger operates two styles of chains in California: Ralph's and Food4Less. Three test sites were chosen from each chain. The Ralph's field test sites were located in San Dimas, Glendora, and Monrovia. The Food4Less test sites were located in Pomona, West Covina and Baldwin Park. Each site operates around 20 hours per day. Field tests were performed to evaluate and compare the performance of the baseline conventional package sealers and new on-demand package sealers.

ProVision Eagle 120 data loggers were installed between the package sealer plug and the outlet servicing each package sealer. Power data was measured and logged in 10-second intervals by the ProVision Eagle 120. A low sample interval was chosen to accurately catch the pulsing of the heating elements. The power monitoring equipment monitored each system for six weeks. The six-week monitoring period was deemed long enough to mitigate data outliers and other variances that may occur because of alterations to the supermarkets' typical usage patterns. As a result, the quantity of product sealed by each of the baseline units and on-demand units was assumed to be approximately the same, and, therefore, was not monitored for this study.

RESULTS

Table 1 displays the power demand, demand reduction, total energy consumption, and energy savings derived from this study for the conventional package sealer and new on-demand package sealer. Note, while the on-demand unit has a larger heating element (approximately 1.5 kW larger) relative to the baseline, demand was determined by the average power draw during the peak hours from 2PM to 5PM.

TABLE 1. DEMAND AND ENERGY CONSUMPTION DATA FOR PACKAGE SEALERS

	DEMAND (kW)	TOTAL ENERGY CONSUMPTION (kWh/YR)
Ralph's		
Conventional Package Sealer	0.27	2,311
On-Demand Package Sealer	0.05	412
Reduction/Savings	0.22	1,899
% Reduction/Savings	81%	82%
Food4Less		
Conventional Package Sealer	0.23	1,810
On-Demand Package Sealer	0.04	395
Reduction/Savings	0.19	1,415
% Reduction/Savings	83%	78%

From the data provided in Table 1, the new on-demand package sealers provide an annual energy savings of 1,899 kilowatt-hours per year (kWh/yr) and a demand reduction of 0.21 kW for Ralph's stores. Similarly, for Food4Less stores the new on-demand package sealers provide an annual energy savings of 1,415 kWh/yr and a demand reduction of 0.18 kW. Using a simple payback analysis at \$.12/kWh, the on-demand package sealers for Ralph's are estimated to have a return on investment of 0.43 years for replace on burnout (incremental cost) and 1.97 years for retrofit. Similarly, the simple payback at Food4Less is estimated to be 0.58 years for replace on burnout and 2.65 years for retrofit.

The savings determined in this study was a result of eliminating standby losses. The conventional package sealer cycles the larger heating element throughout the day to maintain temperature even when the package sealer is not in use. In general, usage of the package sealers was very limited, thus creating a large savings potential for the on-demand units. Behavior and operational inconsistencies resulted in the difference in annual energy consumption between the two chains. The package sealers at Ralph's stores were typically left ON for 24 hours per day, resulting in greater standby losses. The package sealers at Food4Less were typically turned OFF by workers between 9PM and 6AM.

CONCLUSION

The use of the new on-demand package sealers in lieu of the conventional package sealers at Kroger chains nationwide has the potential to drastically reduce power demand and energy consumption. Installation of the on-demand package sealers at the 152 Ralph's and 47 Food4Less stores within Southern California Edison's service territory can potentially reduce power demand and energy consumption by approximately 82 kW and 700,000 kWh annually.

RECOMMENDATION

Based upon the energy savings and demand reduction test results, the recommendation is for Kroger to install the new on-demand package sealers in their Ralph's and Food4Less stores nationwide.

APPENDIX A. BASELINE PACKAGE SEALER SPECIFICATION SHEET – HOBART HWS-4-C

<div style="border: 1px solid black; padding: 2px; display: inline-block;">HOBART</div> 701 S Ridge Avenue, Troy, OH 45374 1-888-4HOBART • www.hobartcorp.com	HWS-4-C HAND-WRAP STATION
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STANDARD FEATURES

- Flexible Set-Up
- Easy to Load Film
- 20" Film Capacity
- Fingertip Film Selection
- Low Temperature Film Cut-Off System
- Angled Hot Plate
- Stainless Steel Element
- Heavy-Duty 300 Series Stainless Steel Stand Assembly
- Open Scale Area
- Operates in All Ambient Temperatures
- 12 Hour Timer for Hot Plate and Cut-off Rod to Save Electric
- Convenient Outlet Provided for Scale/Printer Power

ACCESSORIES

- HWS-WRAPAD – Hand Wrap Station Aid
- ACCESS-HWSKIT – HWS Post Assembly Plate for Printer, USB Cable and Power Cable for Control Panel
- QUANTMP-HWSPST – HWS Single Printer Post, Bracket and Scale Support
- POST-LGSP – Post Assembly for Library Look Up
- LIBRARY-SUPPRT



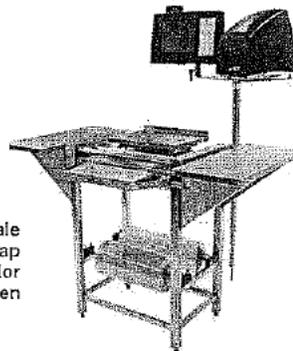
MODEL

- HWS-4-C – Hand-Wrap Station

Specifications, Details and Dimensions on Inside and Back.



HLXP-1 Hand-Wrap System with Color Touch Screen



Access Scale Hand-Wrap System with Color Touch Screen



Quantum Scale System Hand-Wrap Station

HOBART
HWS-4-C HAND-WRAP STATION

HWS-4-C HAND-WRAP STATION



701 S Ridge Avenue, Troy, OH 45374
1-888-4HOBART • www.hobartcorp.com

SPECIFICATIONS

CONSTRUCTION: Heavy-duty stainless steel frame.
36¼" H x 27"W x 27"D. Shelf 12¼"W x 28"D.

HOT PLATE: Teflon covered, eliminates package sticking,
prevents film residue buildup. 15" W x 6"D.

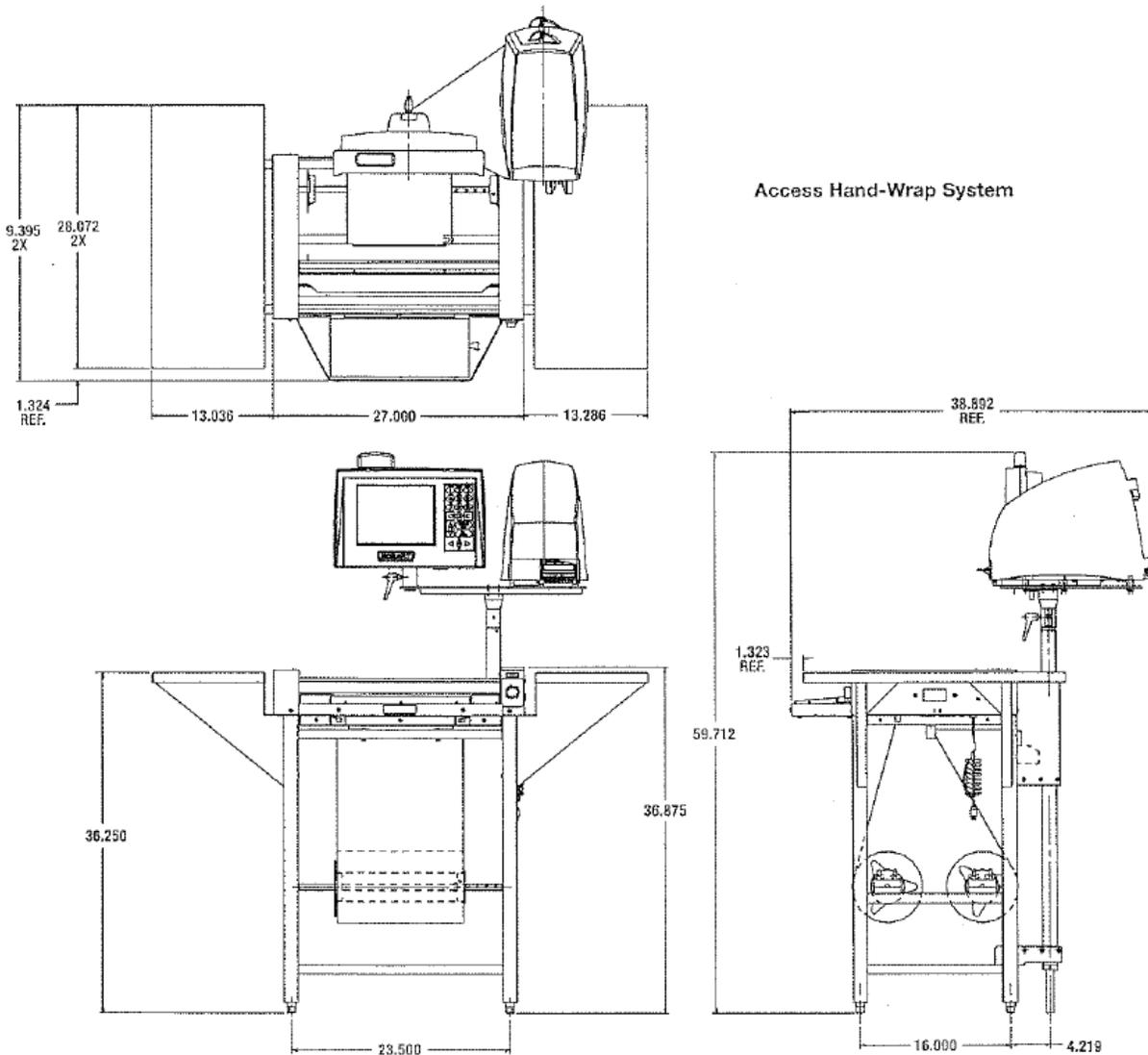
FILM HOLDERS: Two roll film selector. Capacity 10"
diameter x 20" maximum.

ELECTRICAL: 120 Volts, 60 Hertz, single phase, 8.5 Amps.

SHIPPING WEIGHT: HWS – approximately 90 lbs.;
POST-LGSP – 4 lbs.; HWS-WRAPAD – 8 lbs.

**NOTE: SCALE, PRINTER AND POST MUST BE
ORDERED SEPARATELY.**

DETAILS AND DIMENSIONS



APPENDIX B. ON-DEMAND PACKAGE SEALER SPECIFICATION SHEET – HEAT SEAL MODEL 107-ES



Model 107-ES & 107-ESCK

ENERGY SMART™ Wrapper
**FLOOR MODEL WRAPPER
& CONVERSION KIT**

ON-DEMAND HOT PLATE
SIGNIFICANTLY REDUCES POWER
CONSUMPTION

CONVERTS 107A TO ENERGY SMART
107ESFLOOR MODEL WRAPPER



ENERGY EFFICIENT FOR ALL YOUR WRAPPING NEEDS

FEATURES

- 115 Volt Power Supply
 - Electronic Temperature Controlled Film Cut Off Rod
 - 8" by 15" On-Demand Timer Controlled Heated Seal Plate That Significantly Reduces Power Consumption
 - Seal Plate Reaches Seal Temperature Within Seconds
 - Two Selectable Seal Times To Accommodate Different Film Types
 - Thermostatic High Temperature Limit Device
 - Thermistor Controlled Circuit That Reduces Power Consumption As Residual Heat Increases In Seal Plate
 - Stainless Steel Sealer Base and Side Plates
 - Aluminum And Stainless Steel Construction Throughout
 - Stainless Steel Wrapping Surface
 - Supplied With Replaceable Non-Stick Teflon Cover To Maintain A Hygienic Seal Surface
- 107-ES Floor Model:
- Heavy Gauge Welded Aluminum Frame
 - Adjustable Foot Pads For Easy Leveling On Uneven Floors
 - Splash Shield
 - 3 Roll, 18" Maximum Width Film Roll Capacity

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Heat Seal LLC | 4580 East 71st Street Cleveland, OH 44125 USA | Toll Free: (800) 342-6329 | Fax: (216) 341-2163 | www.heatsealco.com



Product Guide

Energy Smart Floor Model Wrapper & Conversion Kit

Quality Made in the USA

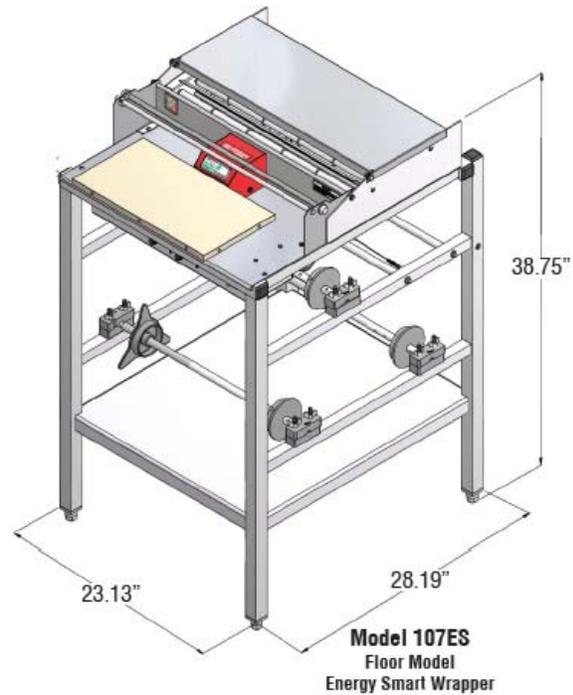
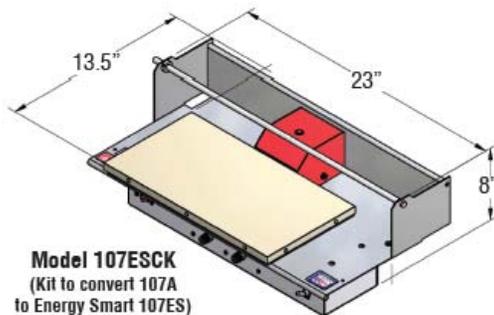
Machine Specifications 107-ESCK

Overall Dimensions	13.5" D, 23" W, 8" H (34.3 D, 58.4 W, 20.3 H cm)
Power Requirement	115 Volt, 19 Amp, 60Hz (20A breaker, GFCI protected circuit)
Wattage	2000 Watts (Non Continuous)
Weight	15 lbs. (6.8 kg)

Machine Specifications 107-ES

Overall Dimensions	28.19" D, 23.13" W, 38.75" H (71.6 D, 58.7 W, 98.4 H cm)
Power Requirement	115 Volt, 19 Amp, 60Hz (20A breaker, GFCI protected circuit)
Wattage	2000 Watts (Non Continuous)
Working Height	36.25"
Weight	47 lbs. (21.32 kg)

Machine Footprints



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