Structural Concepts®
DELIVERING FRESH. ALWAYS.™

Total Cost of Ownership Report

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Abstract

Structural Concepts Corporation commissioned Intertek Laboratories and The National Food Lab, leading independent organizations that specialize in product testing and consultancy services, to conduct a study on refrigerated and heated display case performance. *This report was originally prepared in October 2023 and has been updated to reflect results based on equipment operating with R290 refrigeration. Note: The previous report included Federal and RPI in the refrigerated model section. These two manufacturers have been excluded from the update due to lack of R290 available equipment. Hussmann equipment has been added.*

Structural Concepts (SCC) | Hussmann | Turbo Air | Federal Industries* | RPI*

**Heated models only*

The objective of the study was to compare the equipment based on the following factors to determine total cost of ownership.

1. Time to uncrate, position and start up the equipment.
2. Daily energy costs to operate the equipment.
3. Time to carry out cleaning & maintenance requirements recommended by the manufacturer.
4. The value of the product that must be discarded due to the equipment not maintaining safe product temperatures through the product's recommended shelf life duration or losing acceptable product quality.

Intertek Laboratories tested items 1-3 and The National Food Lab carried out product shelf life testing to validate #4. All equipment was tested in the same conditions as noted in the full reports from these agencies.

In addition, equipment acquisition price and expected life of operation are being considered in the total cost of ownership. Acquisition price refers to end user's price and is estimated based on the dealer's price from the manufacturer plus a margin. *This report has been updated to reflect pricing as of February 2026.* Expected life of the equipment is 5 years.

In the R290 updated version, the study focuses on refrigerated displays in the multi-shelf category, as well as heated multi-shelf grab & go merchandisers—all representative of current market need and increasing demand.

The study identified the following total cost of ownership results for each of the categories based on an equipment life of 5 years.

Manufacturer's equivalent of multi-shelf refrigerated grab & go merchandiser

	Acquisition $*	Start Up $	Energy***	Cleaning****	Product Shrink**	First Year Cost to Own	Following Years Cost to Own	5 Year Cost to Own
Structural Concepts	$11,699	$48	$ 999	$1,088	$0**	$13,834	$2,087	$22,182
Hussmann Corp.	$9,552	$110	$1,278	$2,016	$0**	$12,956	$3,294	$26,132
Turbo Air	$10,304	$68	$1,148	$1,425	$0**	$12,945	$2,573	$23,237

*dealer net $ + margin **All manufacturers safely held food through the recommended shelf life, resulting in zero product loss. ***$.17/kWh ****Per manufacturer recommendations

Manufacturer's equivalent of multi-shelf heated grab & go merchandiser

	Acquisition $*	Start Up $	Energy**	Cleaning****	Product Shrink***	First Year Cost to Own	Following Years Cost to Own	5 Year Cost to Own
Structural Concepts	$15,737	$38	$3,450	$1,104	$23,639	$43,968	$28,193	$156,740
Federal Industries	$14,679	$90	$915	$1,563	$52,635	$69,882	$55.113	$290,334
RPI Industries	$20,131	$33	$3,946	$ 805	$31,525	$56,440	$36,276	$201,544

*dealer net $ + margin **$.15/kWh ***Value of food loss over 4-hour period + labor cost to refill lost food in 4-hour period ****Per manufacturer recommendations

Introduction

The cost to own a food display case includes more than the acquisition price. Costs associated with starting up the equipment, daily operation and maintenance of the equipment, as well as safely displaying fresh food can be significant and often overlooked when making equipment choices. These types of costs are especially important to consider after the first year of acquisition to ensure that profit expectations from the equipment are being met year over year.

In each of the equipment categories studied, acquisition price was similar in at least 2 of the 3 manufacturer models while the difference in the 5 year total cost of ownership widened among manufacturers, demonstrating that an acquisition price comparison doesn't provide the whole story. Some models with the lowest acquisition price experienced the highest or near the highest total cost of ownership.

Differences in energy consumption, maintenance and product loss costs contributed to the higher differences in total cost of ownership among manufacturer models.

Evidence of these claims is further presented in the "Discussions" section of this report.

Discussions

Daily Energy Consumption

The Intertek results show a difference in daily kWh between equipment in each category that ranges from 3-5 kWh/day in the refrigerated models and 54 kWh/day in the heated models. Several factors can affect the daily energy consumption, including but not limited to -> refrigeration system size and refrigerant type, coil design, defrost water burn off method, front air curtain design, internal air flow design and heating method.

In the group of refrigerated grab & go merchandisers (multi-shelf and under counter), SCC has the lowest kWh consumption. Hussman has the highest.

In the heated category, the kWh of Federal's model was significantly lower than SCC and RPI, requiring 16.43 kWh/day compared to 70.73 for RPI and 61.81 for SCC. It should also be noted that the Federal model exceeded safe product temperatures and experienced the lowest rating in product shelf life and integrity. These results likely correlate with the lower energy consumption design.

Cleaning

The differences in cleaning costs between manufacturers can be attributed to multi-part designs for shelf assemblies that require more time to disassemble, as well as manufacturer recommendations on the frequency of cleaning activities. Some models include smaller refrigeration coils that collect dust & debris faster and require more frequent cleaning and/or provide limited access to critical components for cleaning, increasing time to carry out the task.

Product Shelf Life

Within the group of refrigerated multi-shelf grab & go merchandisers, The National Food Lab tested the level of foodborne bacterial proliferation in packaged fresh foods during the manufacturer's recommended shelf life duration to identify any impact of the equipment's refrigeration cycle on product loss. Pathogens were not found in any product stored in any of the three manufacturer's refrigerated displays tested and therefore product loss was not experienced.

In the group of heated merchandisers, the test involved sensory acceptance of packaged fresh foods during a 4-hour display period. The food items tested included: breakfast sandwich, spinach artichoke souffle, sliced pizza, fried chicken strips, breakfast plate (eggs/sausage), and pancakes.

The SCC heating unit had the longest shelf life for the following products: breakfast sandwich, spinach artichoke souffle, pizza, fried chicken strips, and breakfast plate with 4 of the 6 items considered acceptable through 3 hours and 1 item acceptable through 4 hours. SCC's performance matched Federal and RPI for chicken strips with all three manufacturers holding for 2 hours before reaching unacceptable product quality.

RPI had the longest shelf life for pancakes with all other food items considered unacceptable after 1.5-2 hours.

The Federal heating unit performed the worst among all three pieces of equipment, with a maximum acceptable hold time of 2 hours for pizza. All other items were deemed unacceptable after 1 hour.

The following scenarios were developed to demonstrate the impact of product shelf life testing on total cost of

Scenario 1 focuses on product spoilage

If the same amount of food is expected to be offered to the public and kept hot throughout the day, the spoilage in Federal's merchandiser will be at least 32% higher and RPI's model 11% higher compared to SCC's merchandiser. This is based on taste test results from samples taken every 30 minutes.

Scenario 2 focuses on labor cost associated with filling the display

If the same amount of food is expected to be offered to the public and kept hot throughout the day, the labor costs to refill Federal's merchandiser will be at least 50% higher and RPI's merchandiser 25% higher compared to SCC's merchandiser based on the amount of food that must be discarded and the refill frequency.

Assuming labor cost per hour is $16.54 and hot food is offered 12 hours per day throughout 3 dayparts (breakfast, lunch, and dinner), it will cost approximately $6,555 more per year to keep Federal's merchandiser fully stocked and $1,840 more per year to keep RPI's merchandiser fully stocked compared to SCC's merchandiser.

Conclusion

The objective of this report is to demonstrate an effective comparison of the total cost of ownership of fresh food display equipment. While the total cost of ownership varies based on the style of the fresh food display, the results indicate the necessity to consider more than just acquisition price when selecting a food display case. The indirect costs associated with owning a food display are not readily apparent but are factors that differentiate one manufacturer from another and impact the ability of the equipment to achieve revenue and profit objectives.

The test methods and complete results of this study are detailed in the Intertek Laboratory and The National Food Lab reports.

Testing Sources:

The National Food Lab, Eurofins, 13755 1st Avenue North, Suite 500, Plymouth, MN 55441, "Holding Chamber Shelf Life Study", January 2023.

Intertek Laboratories, 1717 Arlingate Lane, Columbus, OH 43228, "Ownership Comparison of Refrigerated and Heated Display Cases", April 26, 2023 & updated report dated January 29, 2026.

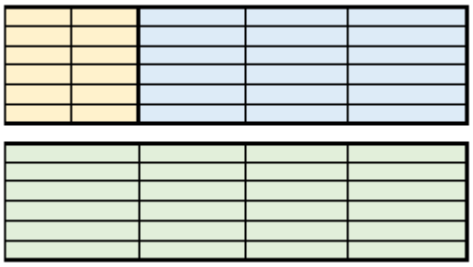
Considerations Made in Results Charts:

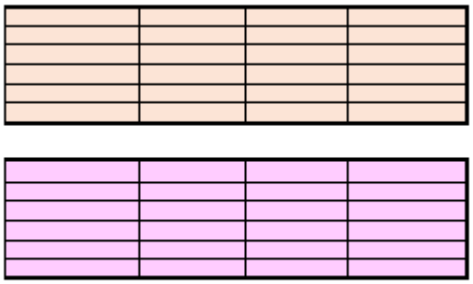
1. Equipment acquisition price is dealer's net price based on manufacturer's discount plus 10% margin. List prices before discount were taken from Auto Quotes.
2. Startup costs based on time to uncrate, position & connect the merchandiser to power multiplied by a contractor rate of $150/hour.
3. Annual energy cost based on average rate of $.17 per kWh.
4. Annual cost for cleaning & maintenance based on manufacturer's guidelines using $16.54/hour for average store labor rate and $150/hour for technical services labor rate. https://www.bls.gov/news.release/pdf/ecec.pdf
5. The value of the product loss in the heated model comparison is the sum of the cost of the food that is needed to be refilled during a 4-hour period plus the labor required to refill based on a merchandising plan-o-gram simulating a typical food layout. Refer to Appendix for details on assumed merchandising layout and cost of goods sold.

APPENDIX

		Qty	Retail Price	Source
	Breakfast sandwich (1)	16	$ 2.99	https://www.syracuse.com/entertainment/emy-2018/04/d552d072772096/gas_station_breakfast_sandwich.html
	Pancakes (2)	4	$ 2.99	https://order.wawa.com/web/product/936a8e19-2719-4ae0-8728-b9985d825aca?category=breakfast%2Fsizzlis
	Breakfast plate (1)	6	$ 4.59	https://order.wawa.com/web/product/870515e9-74aa-4a49-b8f5-97f0135ed829?category=breakfast%2Fbowls%2Fcreate-your-own
	Pizza slice (1)	7	$ 2.99	https://retailwire.com/caseys-general-stores-raises-pizza-prices/
	Chicken Strips (3)	24	$ 3.99	https://order.wawa.com/web/product/5026081f-d24f-4593-891a-49735172b079?category=lunch-dinner%2Fchicken%2Fchicken-strips

Baseline - 4 hour hold, which is operator's goal





Scenario 1 Product Loss

		Qty	Retail COGS	Total COGS	Refills to keep food hot for 4 hrs* SCC	Federal	RPI	Total COGS to offer hot food for 4 hrs SCC	Federal	RPI
	Breakfast sandwich (1)	16	$ 1.05	$ 16.74	1.00	1.50	1.13	$ 16.74	$ 25.12	$ 18.84
	Pancakes (2)	4	$ 1.05	$ 4.19	1.13	1.50	1.00	$ 4.71	$ 6.28	$ 4.19
	Breakfast plate (1)	6	$ 1.61	$ 9.64	1.00	1.38	1.13	$ 9.64	$ 13.25	$ 10.84
	Pizza slice (1)	7	$ 1.05	$ 7.33	1.00	1.38	1.38	$ 7.33	$ 10.07	$ 10.07
	Chicken Strips (3)	24	$ 1.40	$ 33.52	1.50	1.63	1.50	$ 50.27	$ 54.46	$ 50.27
	Total	**57**		**$ 71.41**	**1.13**	**1.48**	**1.23**	**$ 88.69**	**$ 109.18**	**$ 94.21**
				$ 78,194.50	*based on The National Food Lab results			$ 97,117.47	$ 119,557.23	$ 103,163.71
					$ value > SCC				$ 22,439.77	$ 6,046.25
					% > SCC				23%	6%
					$ value of loss**			$ 18,922.97	$ 41,362.74	$ 24,969.22
					**compared to filling once with a total retail value of $78,194.50					
					Extra refill cost per shift				$ 20.49	$ 5.52
					Shifts per day (breakfast, lunch, dinner)				3	3
					Amount of days per year				365	365
					Total extra costs compared to SCC				$ 22,439.77	$ 6,046.25

Assumptions:	
Food gross margin	65%
Dayparts/day (breakfast, lunch, dinner)	3
Days per year	365
Width merchandiser (ft)	3

Scenario 2 Labor cost

			Retail	Total	Refills to keep food hot for 4 hrs			Labor cost per shift		
		Qty	Cost	Cost	SCC	Federal	RPI	SCC	Federal	RPI
	Breakfast sandwich	16	$ -	$ -	1.00	1.50	1.13	$ 5.51	$ 8.27	$ 6.20
	Pancakes	4	$ -	$ -	1.13	1.50	1.00	$ 1.55	$ 2.07	$ 1.38
	Breakfast plate	6	$ -	$ -	1.00	1.38	1.13	$ 2.07	$ 2.84	$ 2.33
	Slice Pizza	7	$ -	$ -	1.00	1.38	1.38	$ 2.41	$ 3.32	$ 3.32
	Chicken Strips	24	$ -	$ -	1.50	1.63	1.50	$ 12.41	$ 13.44	$ 12.41
	Total	**57**		$ -	**1.13**	**1.48**	**1.23**	**$ 23.95**	**$ 29.94**	**$ 25.63**
						31%	9%	$ 26,223.65	$ 32,779.57	$ 28,063.08
						$ value > SCC			$ 6,555.91	$ 1,839.43
						% > SCC			25%	7%

Baseline labor $ to fill/shift	$	19.64
Labor cost per hour	$	16.54
# of shifts		3
Days/yr		365

Difference to baseline labor $	$ 4.31	$ 10.29	$ 5.99
Annual difference labor $	$ 4,716.48	$ 11,272.40	$ 6,555.91
Total Product Loss & Labor $	$ 23,639.45	$ 52,635.13	$ 31,525.13