

# High Performance Frying

## *Get the Most Out of Your Fryer Operation*

*Presented by:*

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Sr Energy Analyst*

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*Mission Critical Support by:*

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Lab Technician II*

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## *Today's Fantastic Guest Speaker:*

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*Download today's presentation:*

[www.fishnick.com/handouts/04262016](http://www.fishnick.com/handouts/04262016)



The Food Service Technology Center (FSTC) program is funded by utility customers through the public purpose program and administered by the Pacific Gas and Electric Company under the auspices of the California Public Utilities Commission.

Fisher-Nickel Inc. has managed the FSTC for PG&E since 1986.

*Our Mission:*

***Promote Energy Efficiency  
in Commercial Food Service***





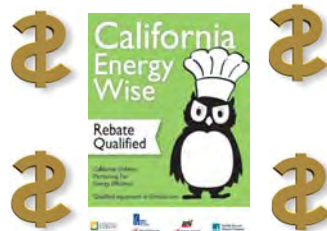
## The FSTC's Foundation is Appliance Testing



*Rigorous Standard Test Methods are the Basis for Real Performance Comparison!*

**FOOD SERVICE  
TECHNOLOGY CENTER**  
PROMOTING ENERGY EFFICIENCY IN FOODSERVICE

*Test Data makes  
Energy Star and Utility Rebates  
possible!*



Pacific Gas and Electric Company

**Food Service Technology Center  
Appliance Test Summary Report**

This report is based on data generated at the FSTC Food Service Technology Center. It is not intended to purchase any MPE or other service not listed in the program. The FSTC California APPEL test program is the property of the California Public Utilities Commission.

<b>Reporting Facility:</b> Fisher, Inc.	<b>Report Number:</b> 501310000
<b>Appliance:</b> Fryer - Gas	<b>Report Date:</b> Sept., 2010
	<b>Tested By:</b> D. Cowan

...the energy input rate, preheat time and energy, idle energy rate and heavy-load cooking... by applying the ASTM F1361-01 Standard Test Method

<b>Heating Value</b>	1038
<b>Duration (min)</b>	13.6
<b>Gas Energy Consumption (Btu)</b>	9,456
<b>Preheat Rate (*F/min)</b>	20.3

**Preheat to 350°F**

<b>Gas Idle Energy Rate (Btu/h)</b>	7,349
-------------------------------------	-------

<b>Load Size (lb)</b>	3.00
<b>Cook Time (min)</b>	2.61
<b>Average Recovery Time (sec)</b>	27.6
<b>Gas Cooking Energy Rate (Btu/h)</b>	67,900
<b>Energy to Food (Btu/lb)</b>	573
<b>Energy to Appliance (Btu/lb)</b>	1,158
<b>Cooking-Energy Efficiency (%)</b>	50 ± 0.4
<b>Production Capacity (lb/hr)</b>	58.7 ± 1.4

\* based on a minimum of three test replicates.

Appliance  
M.P.G.

**FOOD SERVICE TECHNOLOGY CENTER**  
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## It's All About Energy To Food!

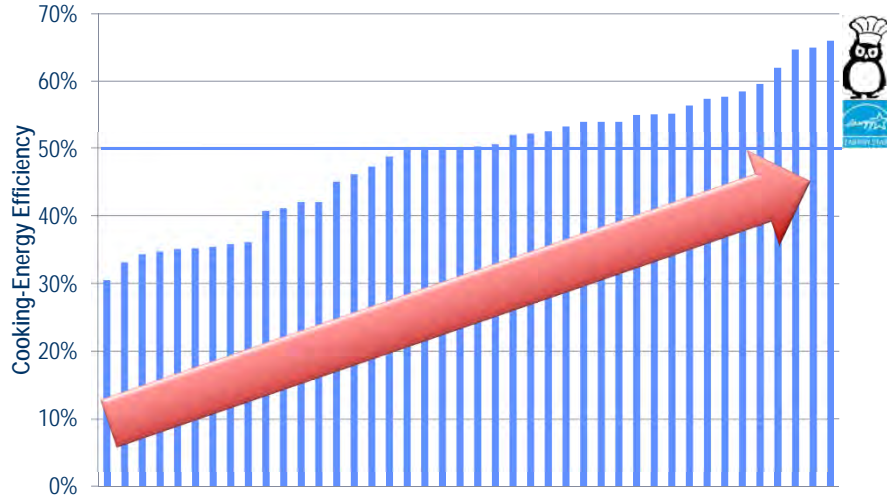


Efficiency =  = %



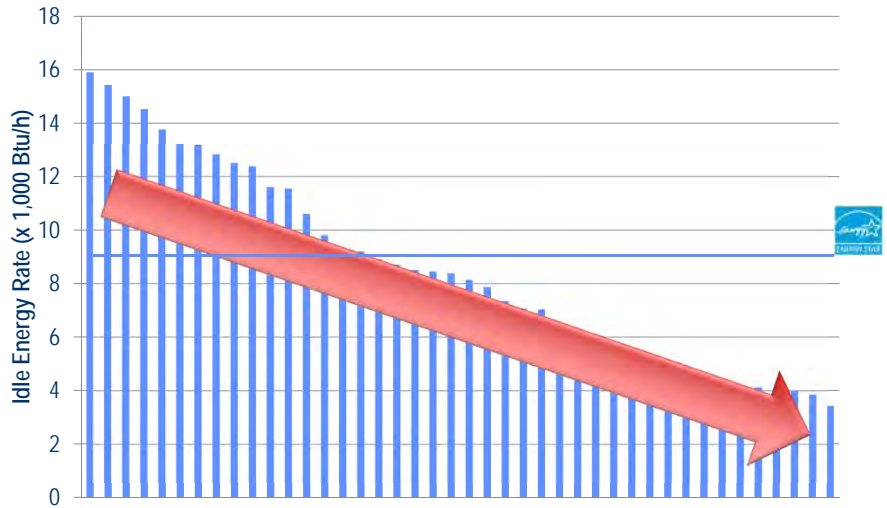



# Gas Fryer Efficiencies



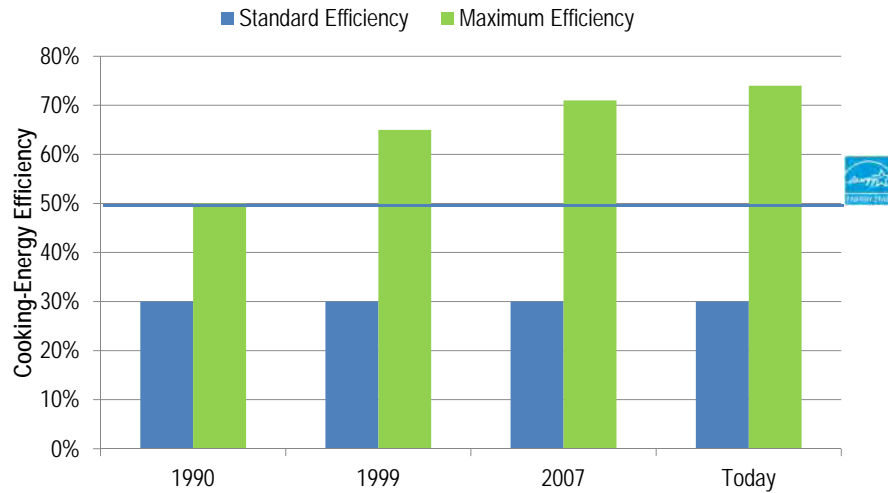
42 gas fryers

# Gas Fryer Idle Rates

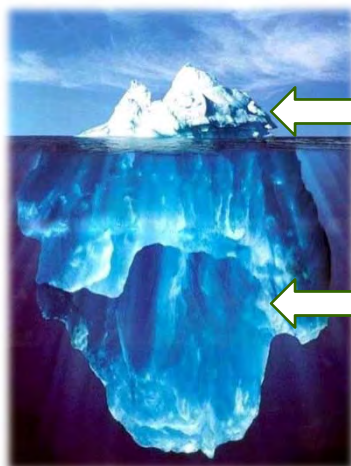


42 gas fryers

## *Improvements Over Time!*



## **Calculating Appliance Energy Costs** *Are Efficient Fryers worth the Investment?*

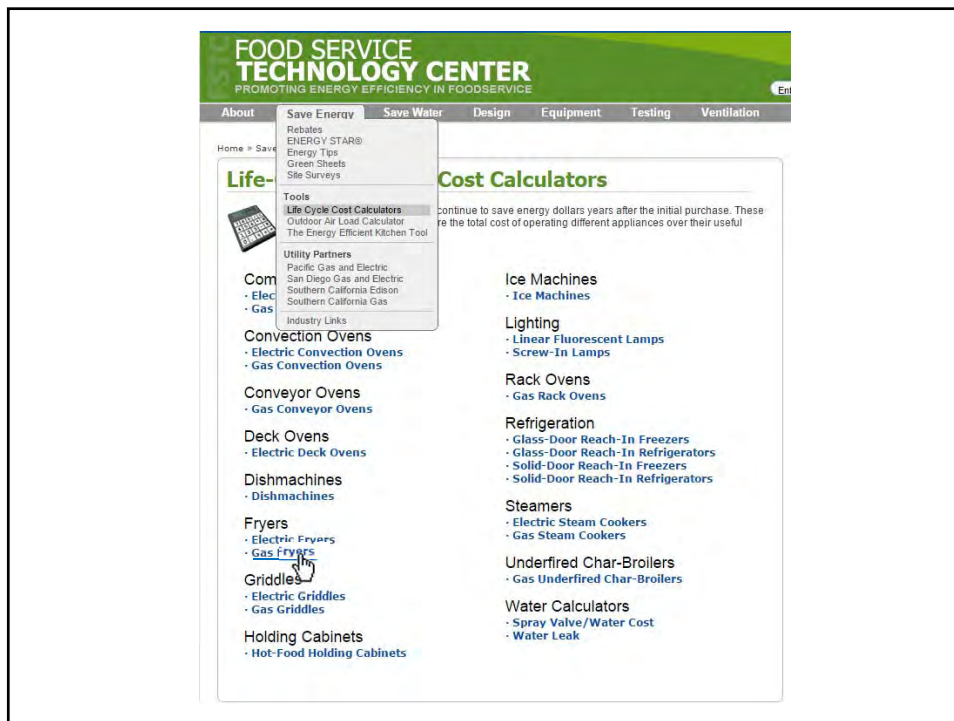


**Acquisition Cost**

**Sustainability Cost**

- Energy
- Water
- Maintenance







### Gas Fryer Life-Cycle Cost Calculator

[About](#) | [How To Use](#) | [Definitions](#)

User Inputs			
Choose a Fryer: (optional) Generic Model: <span style="border: 1px solid black; padding: 2px;">High Efficiency</span>	User Input Fryer	Base Efficiency Fryer	Energy Efficient Fryer
<b>Fryer Performance</b> (Based on ASTM Standard Test Method F2351 or F2144)			
Fryer Size (inches)	14	14	14
Pre-heat Energy (Btu)	16000	18500	16000
Idle Energy Rate (Btu/h)	6371	17990	6371
Maximum Fuel Efficiency (Btu/gal)	67	38.0	67.0
Pre-heat Time (min)	12.0	12.0	12.0
Operating Hours per Day (h/day)	263	263	263
Pre-heat Cycles per Day	1	1	1
Pre-heat Energy Cost per Day (cents)	100.0	100.0	100.0
Pre-heat Energy Cost per Year (cents)	26300	26300	26300
Pre-heat Energy Cost per Year (\$)	263.00	263.00	263.00
Idle Energy Cost per Year (cents)	167658	473937	167658
Idle Energy Cost per Year (\$)	1676.58	4739.37	1676.58
Annual Energy Cost (cents)	193958	737237	193958
Annual Energy Cost (\$)	1939.58	7372.37	1939.58
Initial Cost of Fryer (\$)	5200	3000	5200
Discount Rate (percent)	0.00	0.00	0.00
<input type="button" value="Calculate"/> <input type="button" value="Reset Fields"/>			
Annual Results			
Annual Energy Consumption (Therms)	662	1301	662
Average Energy Consumption Rate (Btu/h)	15197	29870	15197
Annual Energy Cost (\$)	\$662	\$1301	\$662
Input Additional Costs (Optional)			
Consumable Costs per Year (e.g., oil, filtration, etc.)	\$0	\$0	\$0
Maintenance Costs per Year	\$0	\$0	\$0
Initial Cost of Fryer	\$5200	\$3000	\$5200
Lifetime Results			
Lifetime Energy Cost	\$4634	\$9107	\$4634
Lifetime Consumable Cost	\$0	\$0	\$0
Lifetime Maintenance Cost	\$0	\$0	\$0
Initial Cost of Fryer	\$5200	\$3000	\$5200
Total Lifetime Cost	\$9834	\$12107	\$9834
Optional: Name for Printed Results: (Generic High Efficiency Model)			
<input type="button" value="Print Results"/>			

Annual Operating Cost Savings: \$640

ROI: 3.4 years

Lifetime Cost Savings: \$2,273


ROI with CA Energy Wise Rebate: 2.3 years

## PG&E Fryer Replacement Case Study

### Location: Chow, Danville


Measured Energy Use				
Hotline Location	Mainline Old Fryer (heavy use)	Mainline NEW Vulcan VK45 Fryer (heavy use)	Grill line Old Fryer (light use)	Grill line NEW Pitco VF35 Fryer (light use)
Daily Energy Use (therms)	3.6	1.3	2.8	1.6
Annual Energy Use (therms)	1,287	452	990	573
Annual Operating Cost Savings (\$)		\$835*		\$417*

\*Operating cost savings based on a natural gas utility rate of \$1.00/therm.



→

Main line Fryer



→

Grill line Fryer

**If you had to gas up your fryer every morning, your perspective would quickly change...**



## **Beyond Energy**

*Selecting, Using and Maintaining the Fryer and Oil*

### **The Fryer ?'s**

- 1. Food Product**
- 2. Fryer Size**
- 3. Fryer Type**

### **The Oil ?'s**

- 1. Food Product**
- 2. Food/Oil Interface**
- 3. Condition Over Time**
- 4. Filtering**
- 5. Disposal**

# Food Product

- **French Fries**
  - **Onion Rings**
  - **Chicken**
  - **Fish**
  - **Cheese Sticks**
  - **Doughnuts**
  - **Vegetables**
  - **Twinkies**
  - **Etc!**
- Is it . . .*
- **Frozen**
  - **Slacked**
  - **Fresh**
  - **Breaded**
  - **Battered**
  - **Nitrogen Frozen!**

TRIPPLER



## What is being Fried?

### *Field Study Confirms the Obvious!*

Site #	Restaurant Type	Large Chain, Small Chain, Non-Chain	Average Daily Food Production [lbs of food]	Operating Hours of Fryer per week	Temperature of Oil [°F]	Food Items Produced in Fryer
1	Fast Food	Non-Chain	47	87.5	350	<b>Fries</b> , Tater Tots
2	Fast Food	Chain	183	168	360	Tortilla chips, Mac and cheese bites, desserts, breaded fish, breaded chicken, <b>fries</b>
3	Fast Food	Small Chain	161	97	325-351	<b>Fries</b> , onion rings, chicken tenders
4	Sit Down	Small Chain	70	70	375	<b>Fries</b> (fresh cut potatoes, frozen sweet potatoes and frozen potato crisps), battered fish, battered pickles, corn chips, some breaded products, and taco shells
5	Sit Down	Non-Chain	76	48	Not Available	Mozzarella sticks, tortilla chips, shrimp, calamari, chicken wings, battered cod, steak <b>fries</b>
6	Sit Down	Small Chain	32	107	350	French <b>Fries</b> , Onion rings, Sweet potato fries, Chicken Wings, Bacon wrapped dates, Potato fritters, Fried chicken, Tempura beans, Tempura eggplant

## French Fry Types



### *Wild Variation in what comes out of the bag!*



#### **Effecting:**

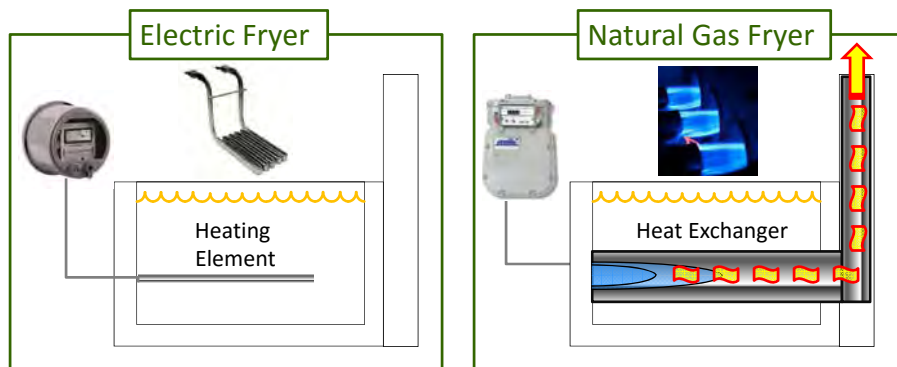
**Cook time, holding time, serving temperature  
and amount of debris in oil**

## Fryer Type

- **Gas or Electric**
  - **Open Vat**
  - **Tube**
  - **Flat Bottom**
  - **Pressure**
  - **Floor**
  - **Countertop**
- Does it have . . .*
- a timer
  - oil temperature display
  - controls that adjust cook time based on oil temp

## Gas vs. Electric Fryers

- electric appliance typically 1.5 to 3 times more efficient
- electricity costs 2.5 to 4 times more per unit of energy
- **gas appliances typically less expensive to operate in California**

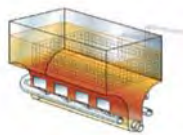


## Electric Fryers

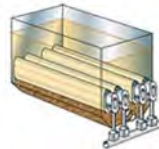
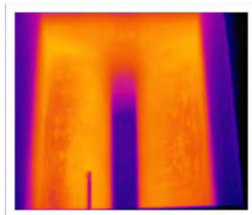
The heating element in the cooking oil



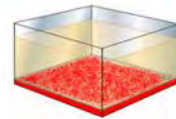
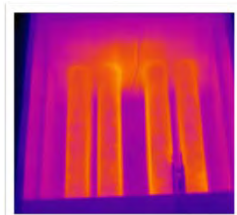
## Gas Fryer Types & Heat Exchangers



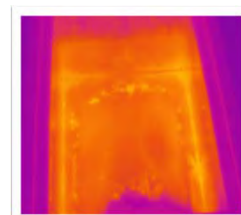
Side Heat



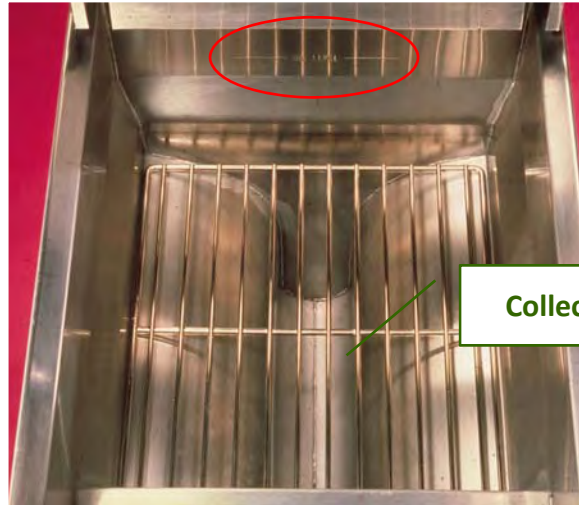
Tube Heat



Flat Bottom



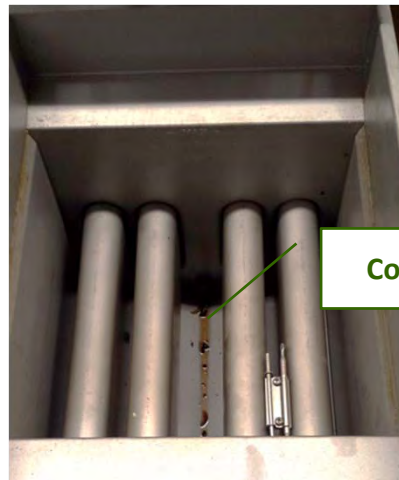
## Gas Side Heat / Open Vat Fryer



*Oil level critical for adequate product coverage!*

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## Tube Heat Fryer



FISHER-NICKEL

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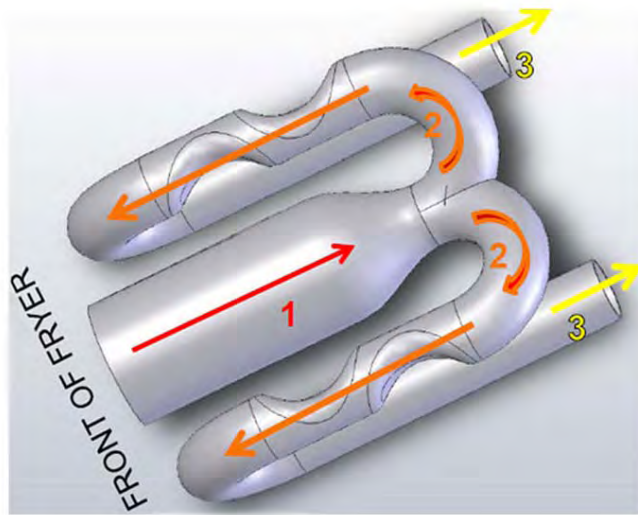
## Advance Tube Heat Exchanger Designs

*More surface area = More heat to oil!*



**Cooking Energy Efficiency: 65%+**

## Vulcan Multi Pass Heat Exchanger





## Cleaning Considerations

Carbon cleaner

High temperature brushes



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*Don't Forget Behind the Door!*



***FIRE HAZARD!***

FISHER-NICKEL

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## Controlling the Fryer

- Lower cost models control oil temperature only
- Mechanical thermostat – No confirmation of Oil operating temper; large temperature swings
- Computer control thermostat = display with temperature readout; better temperature accuracy
- Computer with cooking time recipe and error messages of fry condition



**Millivolt Control**

- Manual pilot ignition
- No power required for operation

**Solid State Control** - Available with Matchless Ignition

- Greater Temperature Control - plus or minus 1°F reactivity from set temperature
- Better recovery, increased production
- Melt Cycle Built In
- Boil Out Built In
- Back up option allows the Solid State control to function as a back up to the Digital Controller, I-12, MultiZone or Profile Computer Control.

**Digital Control** - Available with Matchless Ignition

- Greater Temperature Control - plus or minus 1°F reactivity from set temperature
- Better recovery, increased production
- Melt Cycle
- Boil Out
- Countdown timer with alarm
- Cook time and temperature setting
- Ease of use "touch on/turn off" - 3 product buttons

**I-12 Computer Control** - Available with Matchless Ignition

- Greater Temperature Control - plus or minus 1°F reactivity from set temperature
- Better recovery, increased production
- Melt Cycle
- Ease of Use - 8 or 12 product buttons
- Programmable temperature, soak, shake, and hold functions, volume levels
- Anti-drip over mode - prevents damage to controls during this procedure
- Consistent Product - static timer
- Instant On - Controller calls for heat as soon as a timer is activated instead of waiting for the temperature drop.

**Multi-Zone Computer Control**

All the features of the I-12 plus:

- Perfect for 3 basket configuration
- Simple two step process - Select product, then select zone.
- Different color zone for each basket.
- Eliminates confusion of which product started cooking first.

**HMI Touch Control**

- Saves Over 30 Recipes
- Simple, Intuitive Operation
- Diagnostic Capable
- Customer Graphics and Logos
- Transfer Recipes via CD, Hard Drive, USB or Ethernet
- Proven Reliability & Durability
- Maintenance & Runtime Logs

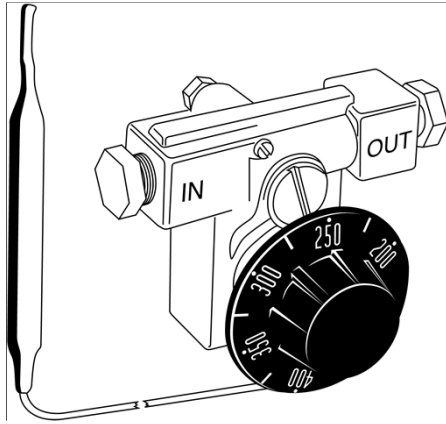
**Profile Computer Control**

All the features of the I-12 plus:

- The ability to set multiple temperature profiles.
- Change temperatures automatically during the cook cycle for the perfect quality product.

Courtesy of Pitco

## Thermostats



- Poorly maintained relays and thermostats can fail\*
- Controls (high limit switches) can easily be overridden
- Sensor Breakage come failure
- Knobs often missing

## Controls Solid-state "Computer Control"



*Fryer selected, now you  
need to fill it!*



**HIGH PERFORMANCE FRYING**

All Oils are NOT Created Equal

Danny Klauer – Foodservice Region Manager

**STRATAS**  
FOODS

**OVERVIEW: WHO WE SERVE**

**PERFORMANCE**  
FOODSERVICE

Good things  
come from  
**Sysco**

**GFS**  
gordon food service

**US.**  
FOODS  
KEEPING KITCHENS COHERING™

**DOT**

**IMA**  
Independent Marketing Alliance

**UNIPRO**  
FOODSERVICE, Inc.

**FROSTY ACRES**

**FEDERATED**  
FOODSERVICE

**Legacy Foodservice Alliance**  
Incomparable Experience

**SIMI Signature**  
QUALITY

**Tolbon**

*formula*  
FOR SUCCESS™

**STRATAS**  
FOODS

**OVERVIEW: WHAT WE PROVIDE**

SOY	CORN	CANOLA	COTTON	PEANUT	PALM	HOCO	MOSO
							

- Clear Frying Oil
- Creamy Frying Oil
- Pan & Grill Oil
- Margarine
- Liquid Margarine
- Cake & Icing Shortening
- All-Purpose Bakery Shortening
- Zero-Trans Options Available

Basically . . .  
Stratas makes it  
ALL  
(just ask)

*formula*  
FOR SUCCESS™

## *From the Bean to the Box...Oil Processing*

- Beans are crushed to make meal and crude oil.
- Crude oil is refined, bleached, and deodorized to make salad oil.
- Salad oil is the beginning of the edible oil array.
- Frying oil is made by adding TBHQ and silicone to salad oil



## *Different oils have different flavors...*

- Soy - grassy, bean-like
- Corn - bland, chippy
- Peanut - nutty, wood-like
- Canola - bland, grassy
- Cottonseed - smooth, clean
- Sun - bland, pine-like



*...and flavor makes a difference!*

## Where does trans fat come from?

- Most of the trans fat in food products comes from hydrogenated vegetable oils.
- Hydrogenation is the process of reacting hydrogen gas with oil to create solid or pliable shortenings.
- One of the results of hydrogenation is the formation of trans fat.
- A “Fully” Hydrogenated oil is a Saturated Fat
- “Fully” Hydrogenated oil does **NOT** contain trans fat
- “Partially” Hydrogenated oil contains Trans Fat

## Creamy Versus Clear

### Frying Oils – Zero Trans

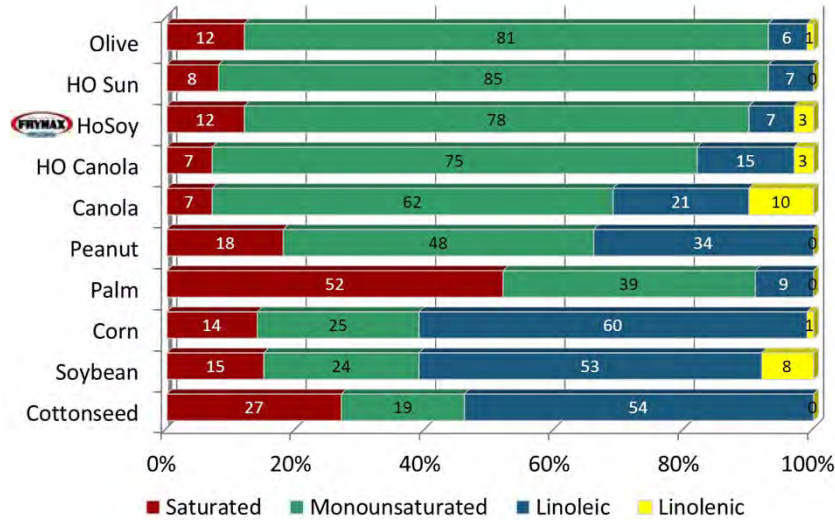
- Some operators believe the creamy liquid affects product mouth-feel and “finish”.
- Breading will have a dry, “matte” look versus a shiny, oily look.
- A matter of operator preference.
- To make a zero-trans creamy liquid, Stratas adds fully hydrogenated oil.
- Fully hydrogenated oils **DO NOT** contain trans fat.





## Fatty Acid Composition

*Each oil has a unique fatty acid profile – almost like a fingerprint*



## Trans Fat – Selling the Science

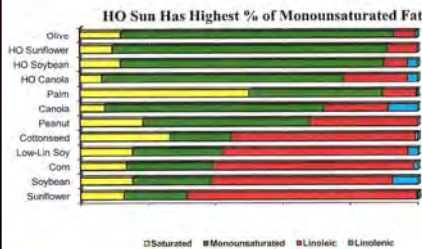


**“Double Bonds” are the weak point in a fat molecule that causes frying oil to break down**

- Saturated fat has no double bonds
- Monounsaturated fat has 1 (mono=one)
- Polyunsaturated fat has 2 or 3 (poly=more than one)
- Linolenic acid is a polyunsaturated fat with 3 double bonds
  - Very unstable in a fryer (off-flavors, smoking, polymerization)

Fatty Acid Common Name	Double Bonds	Frying Stability	Technical Name
Saturated	0	Excellent	Stearic
Monounsaturated	1	Very Good	Oleic
Polyunsaturated	2	Marginal	Linoleic
Polyunsaturated	3	Horrendous	Linolenic

**Key Takeaway:** Monounsaturated fat is the best because it balances the need for frying stability with concerns about cholesterol.



Relative Rate of Oxidation		Linolenic %	
Stearic (Saturated)	1x	Soybean	7.6%
Oleic (Monounsaturated)	10x	HO Canola	3.0%
Linoleic (Polyunsaturated)	120x	HO Soy	3.0%
Linolenic (Polyunsaturated)	250x	Corn	1.2%
		Cottonseed	0.7%
		HO Sunflower	0.0%

**Key Takeaway:** Linolenic acid is 250 times less stable than Saturated. The higher the % of linolenic – the worse the performance.

Fatty Acid	Total Cholesterol	HDL	LDL
Saturated & Trans	↑	↓	↑
Polyunsaturated	↓	↓	↓
Monounsaturated	↔	↑	↓

**Key Takeaway:** Monounsaturated fat is the best because it raises the good and lowers the bad cholesterol.

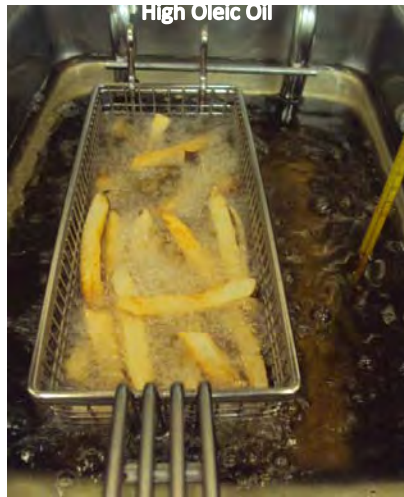
### Selling the Science – Key Selling Points

- High oleic sunflower oil is high in monounsaturated fat
  - Monos balance health (positive effect on cholesterol) with frying performance (only 1 double bond)
- Linolenic acid (a polyunsaturated fat) has 3 double bonds, and is therefore extremely unstable in the fryer
  - Soybean has 7.6% linolenic acid
  - High oleic canola and High oleic soybean have 3%
  - Corn oil has 1.2%; cottonseed has 0.7%
  - High oleic sunflower doesn't contain any linolenic acid
- Linolenic acid causes the “side effects” of oil breakdown, such as off flavors (fishy, painty), smoking, and polymerization





**High Oleic Frying Oils vs Commodity**  
**Fry Study Day 1**



**High Oleic Frying Oils vs Commodity**  
**Fry Study Day 18**



TYPICAL SMOKE, FLASH & FIRE POINTS  
Commercially Available Edible Fats and Oils\*

OIL TYPE	Smoke Point		Flash Point		Fire Point	
	(C°)	(F°)	(C°)	(F°)	(C°)	(F°)
Palm Olein (IV-57)	230	446	324	615	352	666
Palm Hard Fraction (IV-35)	230	446	326	619	352	666
Palm	254	489	324	615	354	669
Coconut Oil	196	385	295	563	330	626
Canola	236	457	326	619	350	662
Hi Oleic Canola Oil	240	464	340	644	360	680
Corn Oil	235	455	325	617	354	670
Soya Oil	240	464	330	626	360	680
Low Linolenic Soya	237	458	331	628	362	684
Hydrogenated Soya Oil (IV 70)	230	446	330	626	360	680
Cottonseed Oil	232	450	319	606	360	680
Peanut Oil	230	446	334	633	360	680
Mid Oleic Sunflower Oil	211	412	319	607	359	678
Hi Oleic Sunflower	244	471	319	606	360	680
Lard	240	464	330	626	360	680
Tallow	230	446	330	626	360	680
Rice Bran Oil	229	444	324	615	368	695
Rice Bran (High Oryzanol)	222	432	316	601	361	682

THE SWEET SPOT

The FRYMAX SWEET SPOT Comparison





## It's All About Fry Cost per Day

- Commodity Oil Cost per Day
  - \$25 case \* 4 cases = \$100
  - \$100/5 days of life = \$20 fry cost per day
- Premium Oil Cost per Day
  - \$40 case \* 4 cases = \$160
  - \$160/10 days of life = \$16 fry cost per day

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### OIL COST BASED ON NUMBER OF DAYS USED

SINGLE	COMMODITY OIL									
CASE COST	1	2	3	4	5	6	7	8	9	10
\$19.65	\$19.65	\$9.83	\$6.55	\$4.91	\$3.93	\$3.28	\$2.81	\$2.46	\$2.18	\$1.97
\$20.00	\$20.00	\$10.00	\$6.67	\$5.00	\$4.00	\$3.33	\$2.86	\$2.50	\$2.22	\$2.00
\$20.35	\$20.35	\$10.18	\$6.78	\$5.09	\$4.07	\$3.39	\$2.91	\$2.54	\$2.26	\$2.04
\$20.70	\$20.70	\$10.35	\$6.90	\$5.18	\$4.14	\$3.45	\$2.96	\$2.59	\$2.30	\$2.07
<b>\$21.05</b>	\$21.05	\$10.53	<b>\$7.02</b>	\$5.26	\$4.21	\$3.51	\$3.01	\$2.63	\$2.34	\$2.11
\$21.40	\$21.40	\$10.70	\$7.13	\$5.35	\$4.28	\$3.57	\$3.06	\$2.68	\$2.38	\$2.14
\$21.75	\$21.75	\$10.88	\$7.25	\$5.44	\$4.35	\$3.63	\$3.11	\$2.72	\$2.42	\$2.18
\$22.10	\$22.10	\$11.05	\$7.37	\$5.53	\$4.42	\$3.68	\$3.16	\$2.76	\$2.46	\$2.21
\$22.45	\$22.45	\$11.23	\$7.48	\$5.61	\$4.49	\$3.74	\$3.21	\$2.81	\$2.49	\$2.25
\$22.80	\$22.80	\$11.40	\$7.60	\$5.70	\$4.56	\$3.80	\$3.26	\$2.85	\$2.53	\$2.28

SINGLE	BRILLIANCE OIL									
CASE COST	1	2	3	4	5	6	7	8	9	10
\$39.25	\$39.25	\$19.63	\$13.08	\$9.81	\$7.85	\$6.54	\$5.61	\$4.91	\$4.36	\$3.93
\$39.60	\$39.60	\$19.80	\$13.20	\$9.90	\$7.92	\$6.60	\$5.66	\$4.95	\$4.40	\$3.96
\$39.95	\$39.95	\$19.98	\$13.32	\$9.99	\$7.99	\$6.66	\$5.71	\$4.99	\$4.44	\$4.00
\$40.30	\$40.30	\$20.15	\$13.43	\$10.08	\$8.06	\$6.72	\$5.76	\$5.04	\$4.48	\$4.03
\$40.65	\$40.65	\$20.33	\$13.55	\$10.16	\$8.13	\$6.78	\$5.81	\$5.08	\$4.52	\$4.07
\$41.00	\$41.00	\$20.50	\$13.67	\$10.25	\$8.20	\$6.83	\$5.86	\$5.13	\$4.56	\$4.10
\$41.35	\$41.35	\$20.68	\$13.78	\$10.34	\$8.27	\$6.89	\$5.91	\$5.17	\$4.59	\$4.14
\$41.70	\$41.70	\$20.85	\$13.90	\$10.43	\$8.34	\$6.95	\$5.96	\$5.21	\$4.63	\$4.17
<b>\$42.05</b>	\$42.05	\$21.03	\$14.02	\$10.51	\$8.41	<b>\$7.01</b>	\$6.01	\$5.26	\$4.67	\$4.21
\$42.40	\$42.40	\$21.20	\$14.13	\$10.60	\$8.48	\$7.07	\$6.06	\$5.30	\$4.71	\$4.24

54

# CHAWS

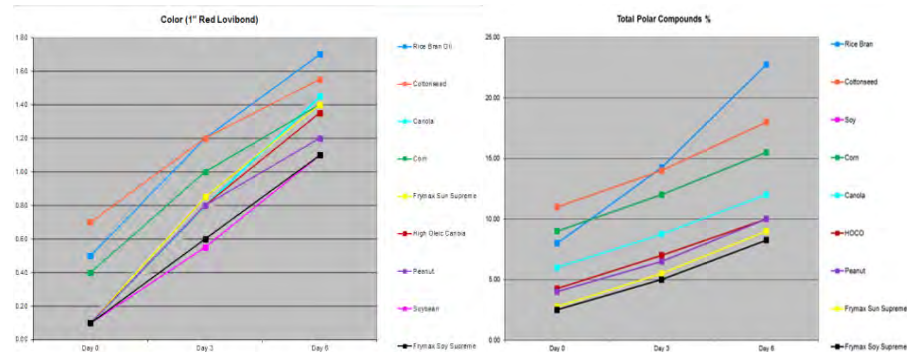
## Five key things shorten oil life - CHAWS: Carbon, Heat, Air, Water, Salt

- Set the **thermostat to 350°**.
- Periodically **check the oil temperature** with a thermometer to make sure the thermostat is accurate.
- **Fry frozen foods frozen**. Do not allow them to thaw before frying. Remove excess ice crystals.
- **Never fill the baskets more than half full** regardless of the food item.
- **Skim** floating particles from the fryer periodically.
- **Never salt or season food items over the fryer**, it will destroy the oil.
- During slack periods, turn the thermostat down to 200°
- **Keep fryer kettles covered** when not in use.
- Keep fryer kettles and baskets clean. Do not wash in dish machine.

## Testing



- Polar compounds are impurities that develop in the oil as it breaks down
  - Europe uses total polars as their benchmark measure of when to discard oil. The US is increasing its use of polars also



## *Let's cook some fries!*



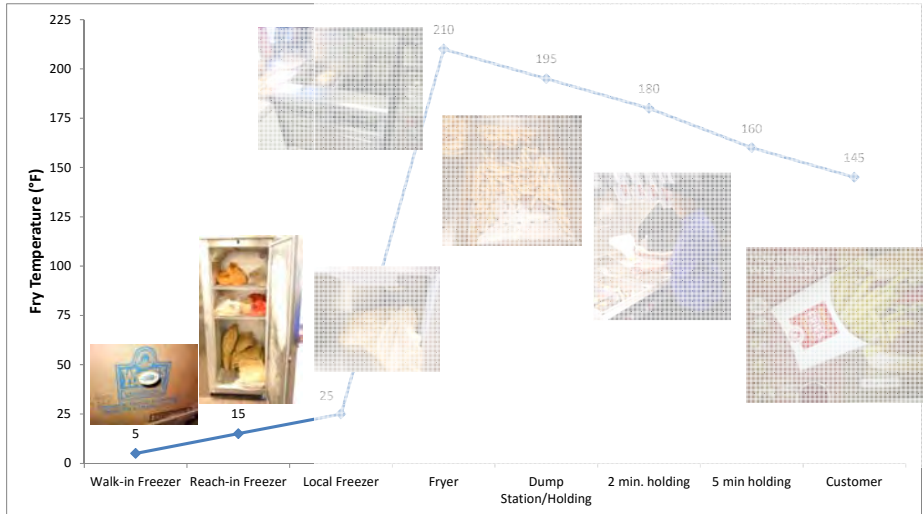
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## *The Fry's Excellent Adventure!*



# Preparation



**Measuring out the basket load size**



**Load size controlled**

## Walk-in or Reach-in Freezer Storage & Staging



Walk-in Freezer



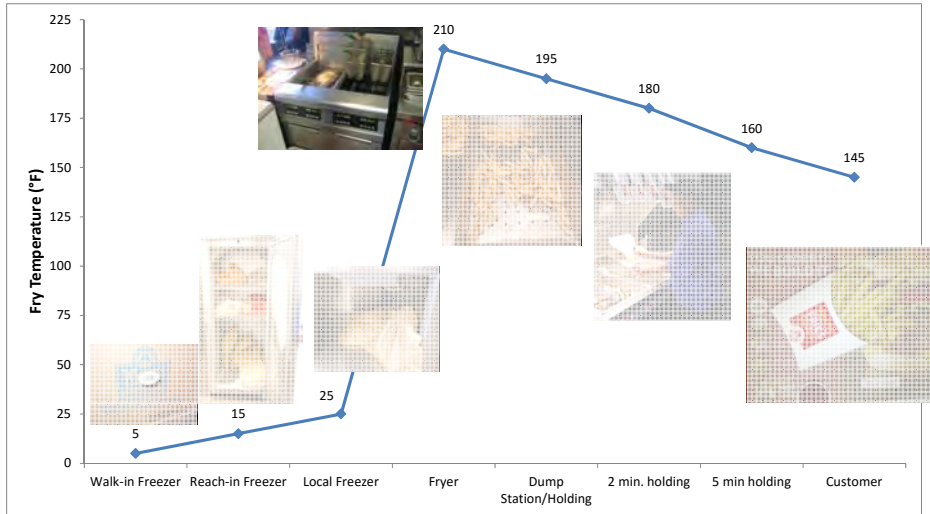
Reach-ins have temperature stratification & fluctuations

## Automatized Fry Dispenser

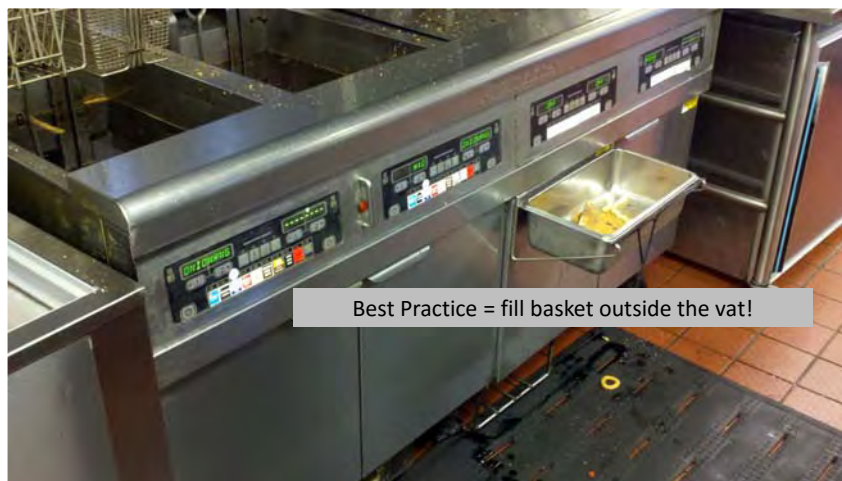
Freezer with proportion control dispenser



## Frying



## Filling the fry basket

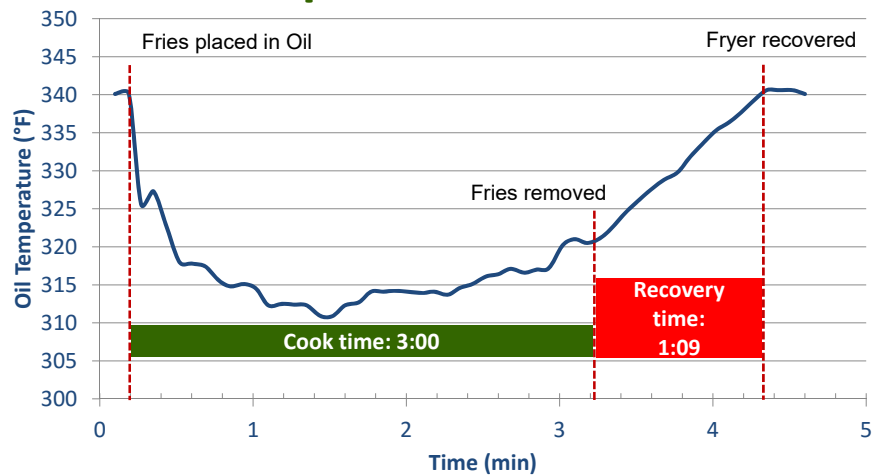




## Fry Cook Time & Oil Temp Recovery

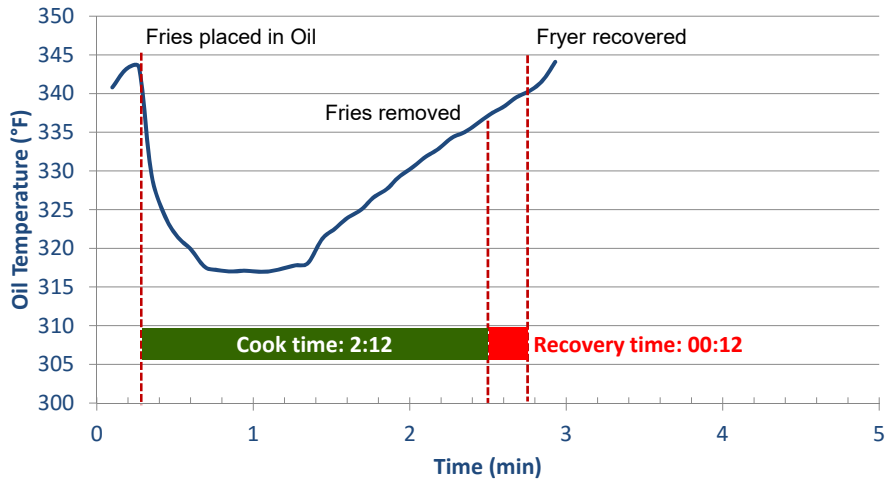


## Standard Capacity Fryer Oil Temperature Profile



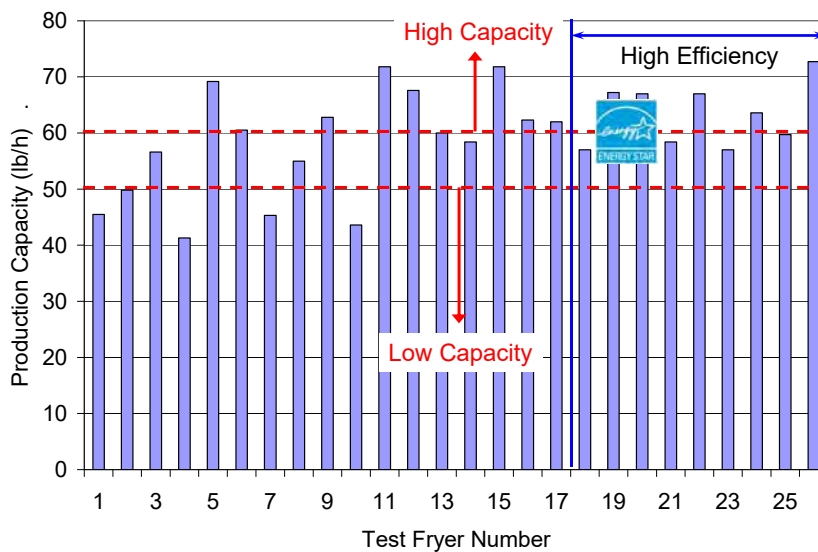
*“Slow” Recovery Time!*

## High Capacity Fryer Oil Temperature Profile

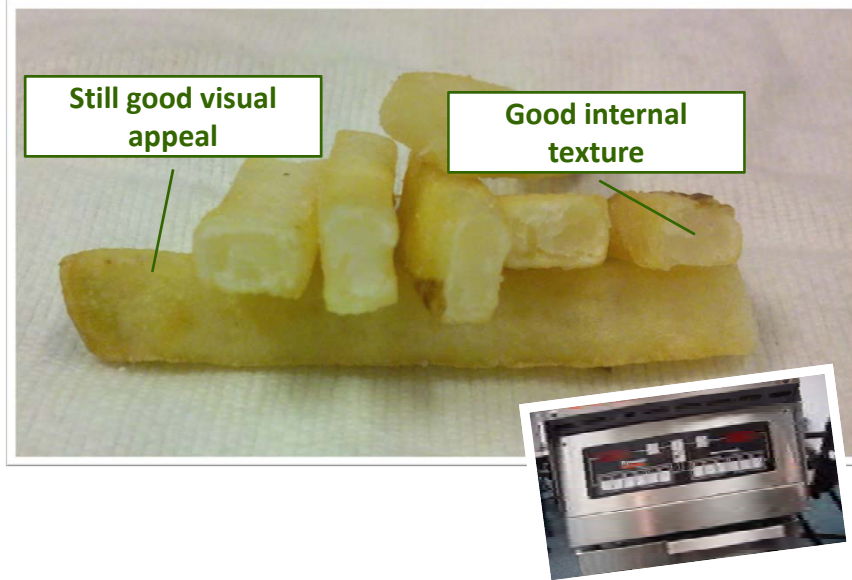


*Near "Zero" Recovery Time!*

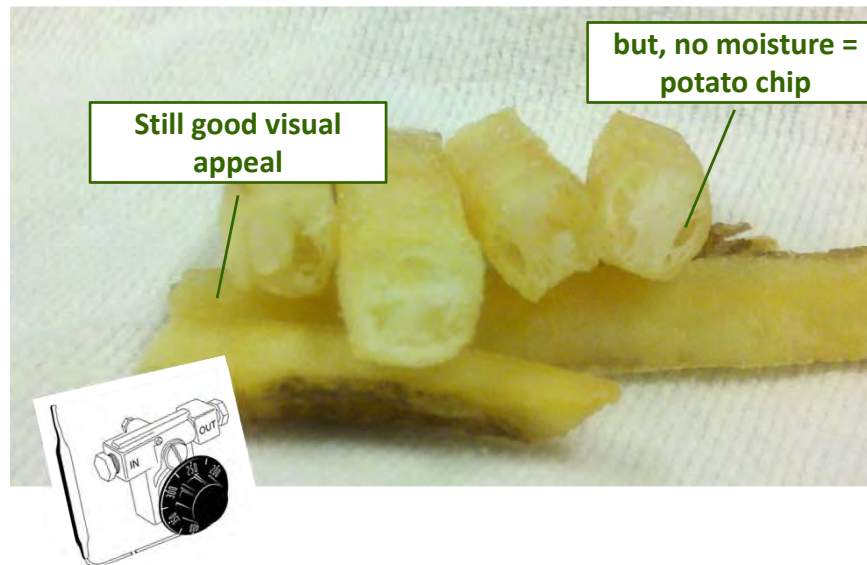
## Gas Fryer Production Capacity



## When is the Fry *Done*?



## When is the Fry *Overcooked*?



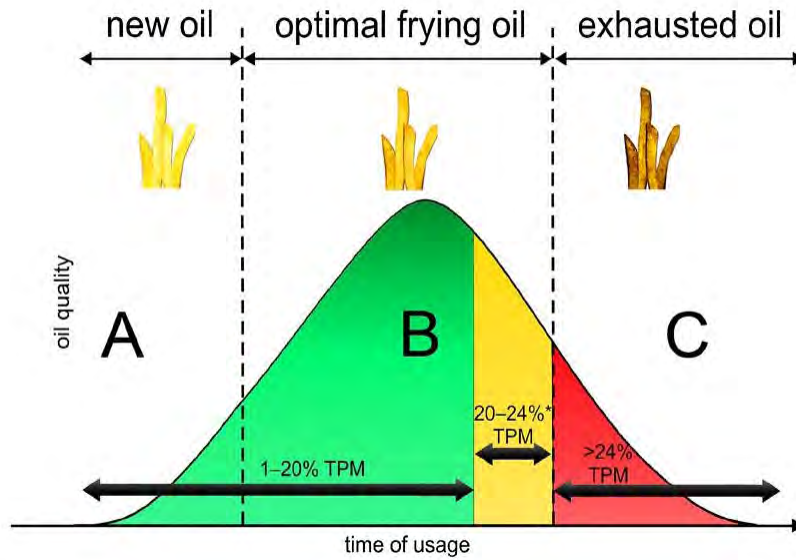
## When do you change your oil?



## Oil Color - Quality

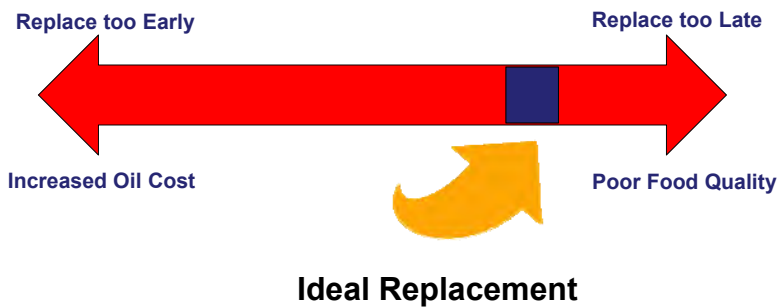


## Optimal Frying Range



## The Oil Life Dilemma

### Oil Life / Oil and Food Quality Tradeoff



# Filtering Helps Extend Oil Life!

## Cone Filtering (C)

- Inexpensive and
- Manual operation

## Portable Filters

- Versatile, capacity
- Reversible
- Proper sizing for
- Requires storage
- Return hose

## Built-In Filtration

- Convenient, easy
- Safe, hands-off
- Readily available
- No extra storage

optimal frying oil

space  
concern

lication,

over free

B

1-20% TPM

20-24%  
TPM

time of usage

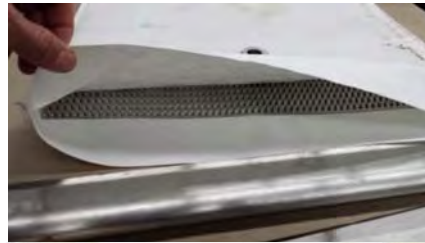


# Filtering

*passing oil through a particle removing media*

Metal mesh screens – larger holes to smaller – finer mesh

Filter papers – 5 micron removal



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New Oil

5 Days no filtration

5 Days Filtering Each Day



## Built-in Filtration is the Best Option



# Low Oil Volume Fryers



*Built in filtration & auto refill!*

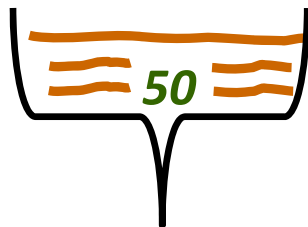
**FOOD SERVICE  
TECHNOLOGY CENTER**  
PROMOTING ENERGY EFFICIENCY IN FOODSERVICE

## Oil Conserving Fryers

40% Less Oil, 10% Less Energy, Outstanding Performance

Standard fryer needs:

- 50 lbs. of oil
- 26.5 liters/22.7 kg



Low volume fryer needs:

- 30 lbs. of oil
- 14 liters/13.6 kg



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Electric Company



# Safety



# Burn Prevention protective Apparel



**SAFETY**



**FRYER FILTERING  
PROTECTION KIT**



## End of Cooking Oils have: Dollar Value

Safe method of transporting used oil



Reality of real world oil waist

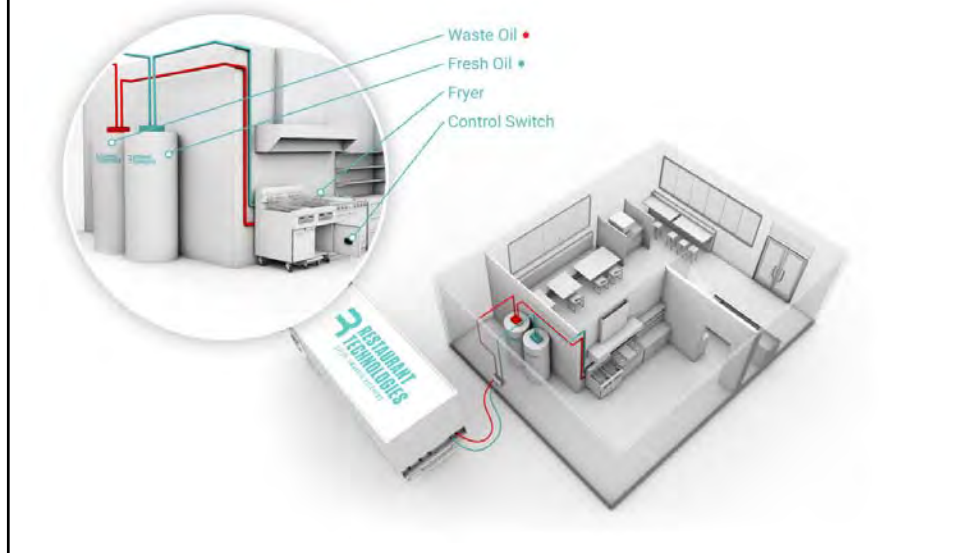
## Used oil transport caddy

Transfer of disposable oil, tank  
in upright position



Can be **Safety Risk**  
when transporting  
HOT oil. If the unit is  
dropped during  
transport hot oil can  
splash forward and  
exit fill / drain.

## Oil Management Simplified



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## 5 *Frying Must Do's*

- **Specify Energy Star & CA Energy Wise Fryers**
- **Match the vat to the food product being cooked**
- **Know your cook times and oil temp**
- **Protect the oil – CHAW on!**
- **Filter frequently with a filter cart or better yet spec' a fryer with built in filtration**

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**Thanks  
for  
Listening!**

**Let's Fry!**

