

# Packaged Filtration Systems For Cooking Oil Applications

Extended operating cycles between downtime/maintenance,  
while reducing heat exchanger fouling

**FrySafe**  
Complete Systems

Exclusive and patented technology continuously removes crumbs and fines from cooking oil to extend oil life and sustain higher product quality. Instead of fines boxes, chip chains, drum filters and paper media, LAKOS CSX Series Separators employ centrifugal action to remove unwanted particle matter from pumped/recirculated cooking oil, concentrating the particulate for easy handling, disposal or recovery for secondary use. Collection vessels also available from LAKOS.

## Benefits of Using FrySafe Complete Filtration Systems

- Full flow filtration of the entire cooking oil reservoir.
- Continuous filtration and particulate disposal.
- Operates in a pressurized, non-oxygenated environment.
- Longer operating cycles between downtime/maintenance.
- Reduced heat exchanger fouling & sustained heat transfer capacity.
- Optimum/consistent cooking oil velocities and the elimination of dead spots within the fryer by the prevention of crumbs and fines accumulation.
- Maximum cooking oil quality, including improved oil appearance and a lighter oil flavor.
- Crumbs and fines removal lowers the rate in which they affect free fatty acids.
- Eliminates fire hazards and operating burdens related to fines boxes.

## Key Features

- No rotating screens or fines boxes to clean or replace
- Low and steady pressure loss, independent of separated crumbs and fines accumulation
- Compact, space saving profile
- Minimal oil loss
- Effective solids concentration for easy disposal
- Stainless steel or carbon steel construction & high temperature componentry
- Pressure rated to 100 psi (6.8 bar); higher pressures also available
- Flanged, inlet, outlet and purge connections
- Full internal accessibility for cleaning/serviceability



FrySafe System

Flow range:  
50 - 6125 US gpm  
(11 - 1390 m<sup>3</sup>/hr)

Maximum standard pressure rating:  
100 psi (6.8 bar)

*For stand-alone Separators refer to literature, LS-733 CSX Separators. Consult factory for special requirements.*

## Standard System Components

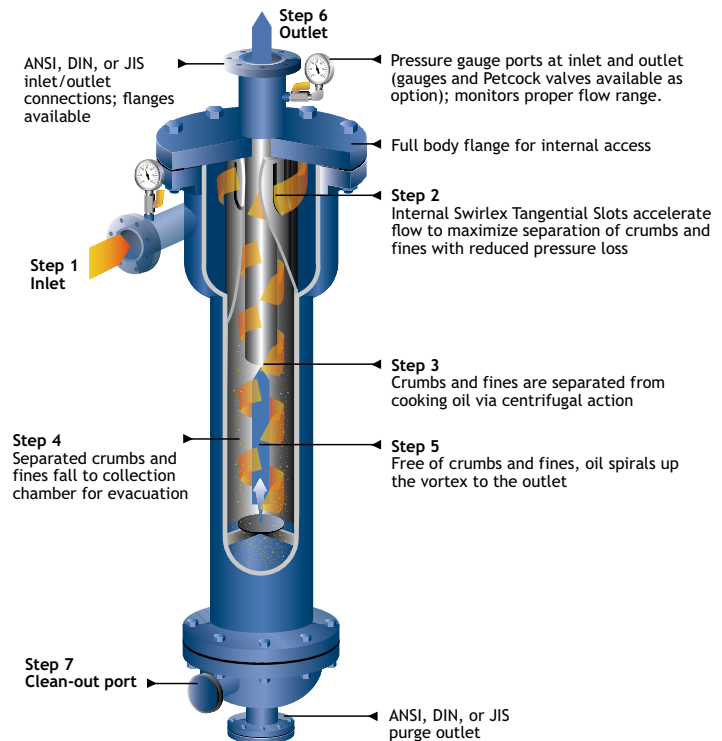
- CSX Separator (304L) Optional: Carbon Steel
- (2) Collection Vessels with safety shroud (304L)
- (2) Isolation Handles (304L)
- (4) Isolation Valves (316L)
- (2) Blow Down valves with check valves (316L)
- 3-Way Diverter Valve (316L)
- (4) Pressure Gauges
- (2) Analog Temperature Gauges (316L)
- Stand with Components Mounted (304L)

## How A LAKOS CSX Separator Works

### Safety Features

- Hinged shrouds are installed over the Collection Vessels, covering the seal of the lid, to prevent accidental splashes and spraying of an operator.
- Two manual isolation ball valves, one on the inlet to the collection vessel and one on the discharge or return of the vessel, to completely shut-off the flow of oil to the vessel.
- A mechanical lever system ties together the opening and closing operation of the two manual isolation ball valves. When the valves are open, the position of the lever system handle prevents the shroud from being opened. There is one lever system on each collection vessel.
- An analog temperature gauge (thermometers) installed on the outside of the collection vessel for visual inspection by the operator prior to opening vessel. There is one gauge on each collection vessel.
- Analog pressure gauges installed on the collection vessel for visual inspection by the operator prior to opening the vessel up.
- Collection vessels are numbered for easy identification.

NOTE: Certain caustic washing may degrade the integrity of carbon steel tanks, pumps, and centrifugal separators. We recommend only stainless steel products in these applications.

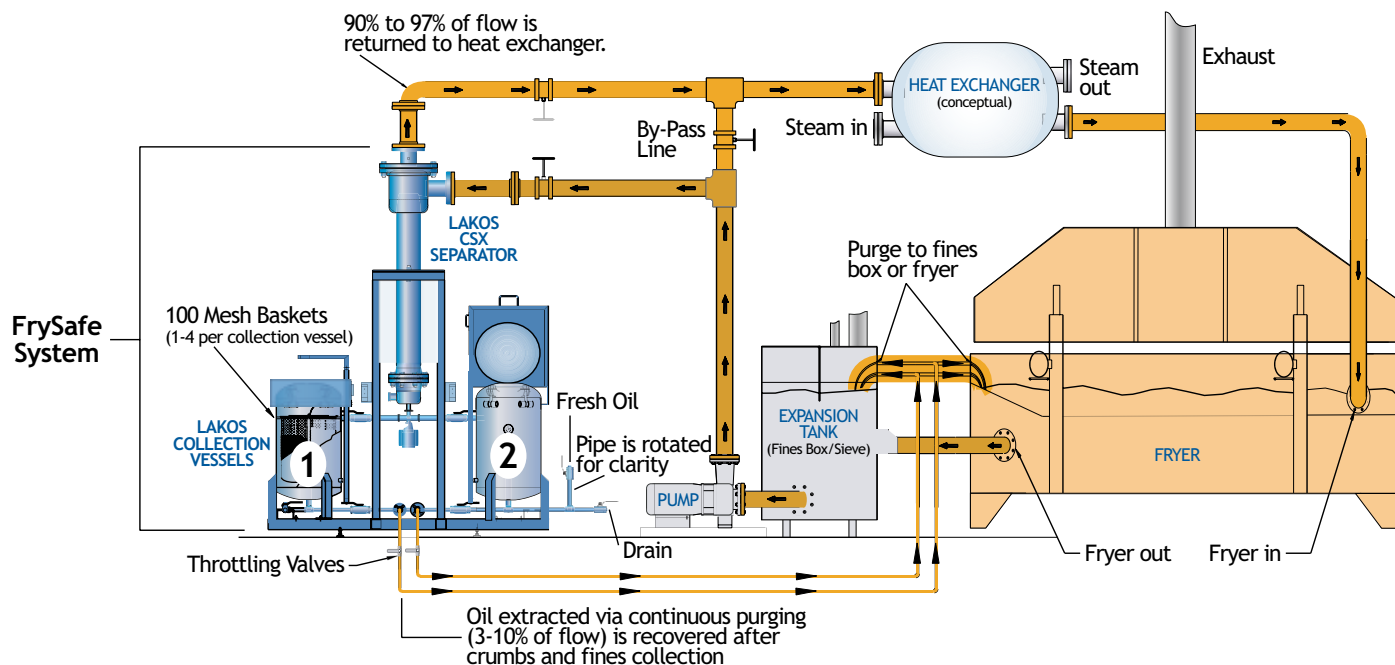


### FrySafe Systems

Flow range: 50 - 6125 US gpm (11 - 1390 m<sup>3</sup>/hr)  
 Maximum standard pressure rating: 100 psi (6.8 bar)  
 Max. standard temperature rating: 400° (204° C)

### Cleans Oil and Removes Crumbs and Fines in a Safe Working Environment

The FrySafe system is a complete skid-mounted, Collection Vessel system (2 vessels) for removing crumbs and fines from a fryer. The separator purge flows to a Collection Vessel where the crumbs and fines are collected in wire mesh baskets. The clean underflow is returned to the fryer. When Collection Vessel 1 is full, a manual 3-way valve can be switched to change the purge flow to Collection Vessel 2. When Collection Vessel 1 is cooled to room temperature, it can be cleaned and returned to service.



LAKOS FrySafe Systems are available in vertical and horizontal (low profile) configurations.

NOTE: Full-flow filtration of the entire cooking oil reservoir is not recommended for side-stream applications.

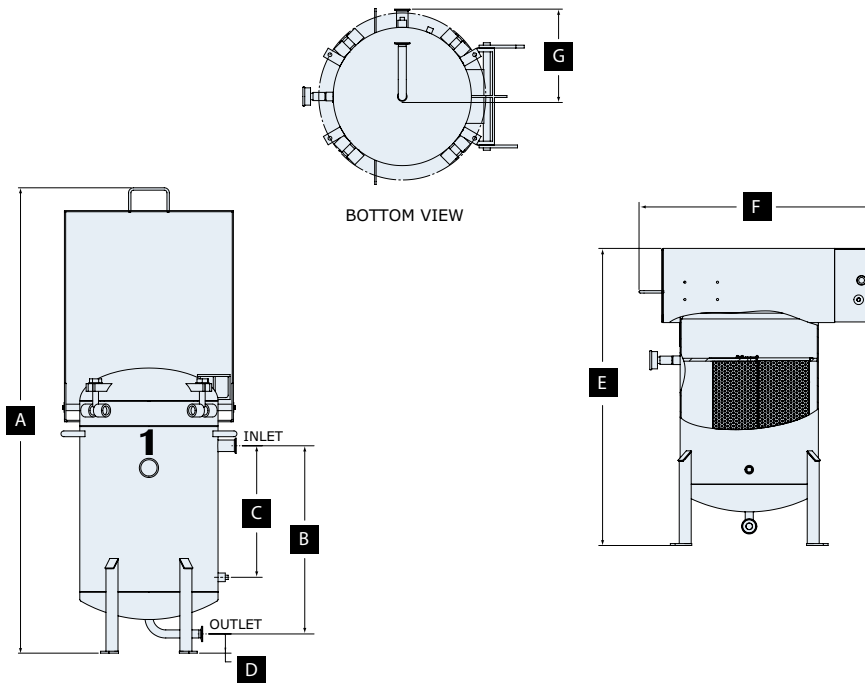
## Model Specifications

Model	Flow Range (Cooking Oil Only)		Inlet/Outlet Size *ANSI Flange	Inside Oil Capacity	
	U.S. gpm	m <sup>3</sup> /hr		U.S. gal.	liters
FrySafe-0075	75-125	17-29	2-inch	70.0	265.7
FrySafe-0110	110-180	25-40	2-1/2-inch	71.7	272.2
FrySafe-0165	165-280	38-65	3-inch	72.0	273.3
FrySafe-0250	250-400	57-90	4-inch	80.7	306.2
FrySafe-0360	360-670	82-152	4-inch	85.5	324.4
FrySafe-0565	565-1030	130-235	6-inch	98.0	371.7
FrySafe-0815	815-1500	185-340	6-inch	118.0	447.4
FrySafe-1450	1450-2700	330-615	8-inch	171.0	648.0
FrySafe-2300	2300-4250	525-965	10-inch	210.0	795.6

Material construction: Available in carbon steel and 304L or 316L stainless steel.

\*Connections: Inlet, outlet and purge are each standard ANSI, DIN, JIS flanges. DIN and JIS dimensions are slightly different than those shown. Contact LAKOS for more information. Sanitary connections also available.

Collection vessel model for each FrySafe System depends on the flow rate and solids loading.



Dimensional views of collection vessels shown here. For dimensions of total FrySafe Systems, contact the manufacturer for drawings.

## Collection Vessel Options

Model For left and right models	Number of Baskets	External Housing Diameter	Capacity	Volume
BFH-2033-S/FS/M	4	20" Basket Housing	12 GAL	1.604 cu ft
BFH-1833-S/FS/M	3	18" Basket Housing	9 GAL	1.203 cu ft
CRS-816-S/FS/M	1	8" Basket Housing	3 GAL	0.401 cu ft

## Dimensions

Model For left and right models	A		B		C		D		E		F		G	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
BFH-2033-S/FS/M	63 5/8	1616	27	686	15-13/16	402	2-1/2	64	39-15/16	1014	32-1/2	826	12-3/8	314
BFH-1833-S/FS/M	60 5/8	1540	24 1/2	622	17-1/8	435	2-1/2	64	38-11/16	983	30-1/2	775	11-3/8	289
CRS-816-S/FS/M	46 15/16	1192	26 11/16	678	16	406	2-1/2	64	36-11/16	931	21	533	8-7/16	214

## Installation Photos



Collection Vessel



Mechanical Lever System



Complete FrySafe System

## Testimonials

### Limited Warranty

All products manufactured and marketed by this corporation are warranted to be free of defects in material or workmanship for a period of at least one year from date of delivery. Extended warranty coverage applies as follows:

All LAKOS Separators: Five year warranty

All other components: 12 months from date of installation; if installed 6 months or more after ship date, warranty shall be a maximum of 18 months from ship date.

If a fault develops, notify us, giving a complete description of the alleged malfunction. Include the model number(s), date of delivery and operating conditions of subject product(s). We will subsequently review this information and, at our option, supply you with either servicing data or shipping instruction and returned materials authorization. Upon prepaid receipt of subject product(s) at the instructed destination, we will then either repair or replace such product(s), at our option, and if determined to be a warranted defect, we will perform such necessary product repairs or replace such product(s) at our expense.

This limited warranty does not cover any products, damages or injuries resulting from misuse, neglect, normal expected wear, chemically-caused corrosion, improper installation or operation contrary to factory recommendation. Nor does it cover equipment that has been modified, tampered with or altered without authorization.

No other extended liabilities are stated or implied and this warranty in no event covers incidental or consequential damages, injuries or costs resulting from any such defective product(s).

Lakos Separators are manufactured and sold under one or more of the following U.S. Patents: 5,320,747; 5,338,341; 5,368,735; 5,425,876; 5,571,416; 5,578,203; 5,622,545; 5,653,874; 5,894,995; 6,090,276; 6,143,175; 6,167,960; 6,202,543; 7,000,782; 7,032,760 and corresponding foreign patents, other U.S. and foreign patents pending.

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Backer's Chip Plant in Fulton, Missouri has two large fry lines to cook potato chips. A LAKOS complete stainless steel FrySafe CSX System was installed full stream to remove crumbs, fines and chip pieces before they reach the heat exchanger. As the CSX separator removes solids from the cooking oil, the solids are purged to one of two LAKOS Collection Vessels that can be isolated and allowed to cool before the solids-filled wire mesh baskets are removed and cleaned.

Mike Reeves, Operations Manager at Backers Chips, says they love the unit. *"The system is working great. It is virtually maintenance free. Just dump and clean the baskets and the unit continues working the whole time. It made us realize how bad the old system we had was. The LAKOS FrySafe system not only eliminates a serious hazard, it increases the length of time the oil can be used, maintaining better control of the free fatty acids, and an overall better quality product."* For more information about this installation refer to Case Study AB-217.

Top: LAKOS CSX-1450L-S4 (In a FrySafe configuration)

Bottom left: Baskets inside the collection vessel

Bottom right: Purge System showing collection vessels and valves.



One of the largest privately owned snack food vendors in the United States uses a LAKOS CSX-050 HV to ensure the highest quality of potato chip production.


*Name withheld upon request – they consider LAKOS a huge competitive advantage.*

CSX-050 HV



### Return On Investment Example:

Using a LAKOS Separator as an effective filtration method for cooking oil can pay for itself in cost savings in a very short amount of time. A chip processing plant in Ecuador determined that they could extend the effective life of their cooking oil by 50% by using a LAKOS – a savings of over \$85,000 in oil alone per year. Read more about it in Case Study AB-227.

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