Performance Engineered Frying and Filtration Systems
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As the popularity of coated food products has grown, FMC FoodTech has kept pace with the broadest, most efficient line of frying and filtration solutions available. Stein has the industry's largest installed base of fryers and filters for continuous deep fat frying. Food processors know from experience that to achieve product uniformity, efficient heat transfer, sanitation, reliability and the lowest possible operating costs, FMC FoodTech comes through time and again with tailored engineered solutions.

THERMoFIN® (TFF) Fryer
This Stein creation is recognized by food processors worldwide as the ultimate frying machine. Its patented vertical fin heat exchanger transfers heat to the oil quickly and precisely across the length and width of the fryer. The TFF is just one of the many Stein frying solutions available to food processors.
Processors know that every new coated product introduced to the market requires a thorough analysis of the frying and filtering process. At such a time, who better to turn to than our frying and filtration technicians. Pre-fry, full fry, flour coatings, tempura, conventional batters, Japanese-Style; whatever your product calls for, FMC FoodTech has been there and done it better, faster and more efficiently.

Consumers Love Coated Food Products

If there is one certainty in the processed food industry, it’s change. Consumers aren’t content with yesterday’s offerings. We are more adventuresome, more willing to embrace new ideas, new tastes, new colors, new textures. Wherever we stop to eat, at home or away, coated products have proven to be one of our most popular menu items. The trend to coated shows no signs of slowing. At the same time, we have become very discriminating, we expect consistency, good taste, golden brown and a crispy texture.
Proven Fryers and Filters

Getting it just right when frying mass quantities requires systems and technology that are time tested and proven in countless food processing facilities around the globe. This is where FMC FoodTech comes in. Your processing operation must have fryers and filters that can handle the volume and deliver a consistent, high quality product in an efficient and cost effective way, month-after-month, year-after-year. Stein fryers, known for their durability and reliability under the toughest processing conditions, are cooking up millions of pounds of delicious coated food products everyday for quick service, institutional, corporate, healthcare, educational, military, and home consumption. If you think your frying operation isn’t all that it should be, talk to us. We’ll get you on the right track.

Maintaining Cooking Oil Quality

Cooking oil, a costly ingredient in every frying operation, experiences a complex molecular change that results in an increase of free fatty acids, polar molecules and soaps. The process is accelerated by such factors as the heat of frying, exposure of cooking oil to air, salts and other solubles coming from the coatings of the products being cooked and by steam generated as water is boiled off at the surface of the product. The overall quality of the oil in the fryer can be maintained within acceptable limits by controlling these breakdown factors and by a proper program of oil replenishment during the cooking process. Thermal fluid heated fryers, for example, minimize thermal abuse of the cooking oil by delivering heat utilizing temperatures just slightly above the target temperature of the cooking process.

Long-Term Process Productivity

Uniform product quality and verifiable food safety are critical criteria for the food processor that wants to ensure success and long-term growth. It’s not easy to achieve these objectives in the face of growing competition and regulatory oversight. LINK, FMC FoodTech’s comprehensive controls and software solutions suite will help you simplify operations, improve product consistency, optimize yield and ensure process traceability. You can pick and choose the modules you need, adding to them as your requirements change. Together, they’re an unbeatable tool to improve your process, but each brings you many benefits on its own. With LINK, you can have long-term process productivity, from raw material to satisfied consumer!

LINK is comprised of four distinct modules:
Control System Consulting
Process Analysis Service
Productivity Relies on Effective Filtration

A frying operation is only as effective as its hot oil filtering system. Stein has engineered a full line of filtration solutions that continuously and automatically filter cooking oil from the fryer to remove coating sediment and product debris. The primary objective of every Stein continuous filtration system is to return clean oil back to the fryer and to prolong the useful life of the oil. Some filtration models are so effective, they remove particles as small as 10 microns from the frying oil. Some filter up to 95% of single digit micron particles per pass and help to minimize free fatty acid buildup by up to 50%. Multi-stage filters remove progressively finer particles to minimize oil breakdown.

An Unlimited Menu of Coated Products

We like to think that just about everyone has enjoyed food products coated, fried, cooked and frozen in FMC FoodTech equipment. Stein fryers have processed just about every coated product imaginable, with infinite combinations of conventional and tempura batters, flour, free-flowing and Japanese-style coatings:

- Bone In Chicken
- Chicken Nuggets
- Chicken Patties
- Chicken Strips
- Mushrooms
- Broccoli
- Beef Patties
- Poppers
- Pork Patties
- Cauliflower
- Shrimp
- Calamari
- Prawns
- Fish Filets
- Fish Sticks
- Fish Portions
- Sauce Filled Pasta
- Fruit
- Egg Rolls
- Cheese Cubes & Sticks
- Onion Rings
- And Many More
Fryer Heat Method Comparison Analysis

Direct Heat - Direct Fired
The cooking oil is heated in the fryer tank through a direct heat exchange from the primary energy source. The direct heat exchange is usually through gas or electric fired immersion tubes built into the fryer tank.

Key Advantage: Fast response to temperature demands, with minimal oil turbulence.
Key Disadvantages: High heat transfer rates (heat flux) can cause oil scorching on highly spiced fine coatings, are difficult to clean, and require high maintenance on gas versions.

Direct Heat - Indirect Fired (Conventional Tube Style Internal Heat Exchanger)
The cooking oil is heated in the fryer tank through a tubular style indirect heat exchanger using a heat transfer fluid. The heat transfer fluid is heated in a separate heat exchange system using a direct heat transfer from the primary energy source.

Key Advantage: Minimal oil turbulence in the fryer tank.
Key Disadvantages: Slow response to temperature demands, cleaning requirements are high and higher heat transfer rates can cause oil scorching on finer, highly spiced coatings. Additional installation requirements over some types.

LEGEND
- Primary Heat Source
- Thermal Fluid
- Cooking Oil
1. DIRECT HEAT - DIRECT FIRED
(Gas or Electric Direct Immersion Tubes)

2. DIRECT HEAT - INDIRECT FIRED
(Conventional Tube Style Internal Heat Exchanger)

3. INDIRECT HEAT - DIRECT FIRED
(Remote or External Heated)

4. DIRECT HEAT - INDIRECT FIRED (VF)
(Vertical Fin Style Internal Radiator) Stein THERMoFIN® Fryer

**Fryer Heat Methods**

<table>
<thead>
<tr>
<th>Fryer Heat Source</th>
<th>Key Operating Criteria</th>
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<tr>
<td>Indirect Heat - Direct Fired</td>
<td>Fast Response to Temperature Demands, Sufficient Oil System, Minimul Oil Turbulence in Fryer, Low Heat Flux, Gentle Heat Transfer, Uniform End to End Heat in Product Zone, Uniform Side to Side Heat in Product Zone, No Burning or Charring of Fine Sediment, Suitable Available Heat (BTU), Less Radiant Heat Around Fryer, Ease of Sanitation, Low Noise Levels Around Fryer</td>
</tr>
<tr>
<td>Direct Heat - Indirect Fired (VF) (Vertical Fin Style Internal Radiator)</td>
<td>Fast Response to Temperature Demands, Sufficient Oil System, Minimul Oil Turbulence in Fryer, Low Heat Flux, Gentle Heat Transfer, Uniform End to End Heat in Product Zone, Uniform Side to Side Heat in Product Zone, No Burning or Charring of Fine Sediment, Suitable Available Heat (BTU), Less Radiant Heat Around Fryer, Ease of Sanitation, Low Noise Levels Around Fryer</td>
</tr>
</tbody>
</table>

**Key Advantages:**
- Fast response to changing temperature demands
- Minimal oil turbulence
- Lowest heat flux for improved oil quality
- No oil scorching
- Easy cleaning and maintenance

**Key Disadvantages:**
- Additional installation requirements over some types makes this heat method most suitable for medium to high capacity production.
Your Education, Testing and Processing Facilities Away From Home

Chances are, your technicians are working on new coated concepts right now. We invite them to bring their concepts to the FMC FoodTech Technology and Training Centers. Our fully equipped processing facilities have been used by most of the leading processors around the globe to give birth to some of the most popular brands of coated foods on the market. They don't come just for the frying/filtration stage. Some want to utilize the entire line starting with portioning; some want to focus on batter/breading techniques and some choose to investigate multi-phase cooking opportunities. Whatever you choose to do in the FMC FoodTech Technology and Training Center, it will be done in a totally secure environment.

Your One Source for Complete Food Processing Solutions:

- DSI Portioners
- Stein Coating Systems
- Stein Frying and Filtration Systems
- Stein Ovens and Cooking Systems
- Frigoscandia Equipment - Freezing and Refrigeration Systems
- Northfield - Structure Supported Spiral Freezing Systems
- Aftermarket Services
- Food Processing Technology and Training Centers
- LINK™ Controls and Software Solutions