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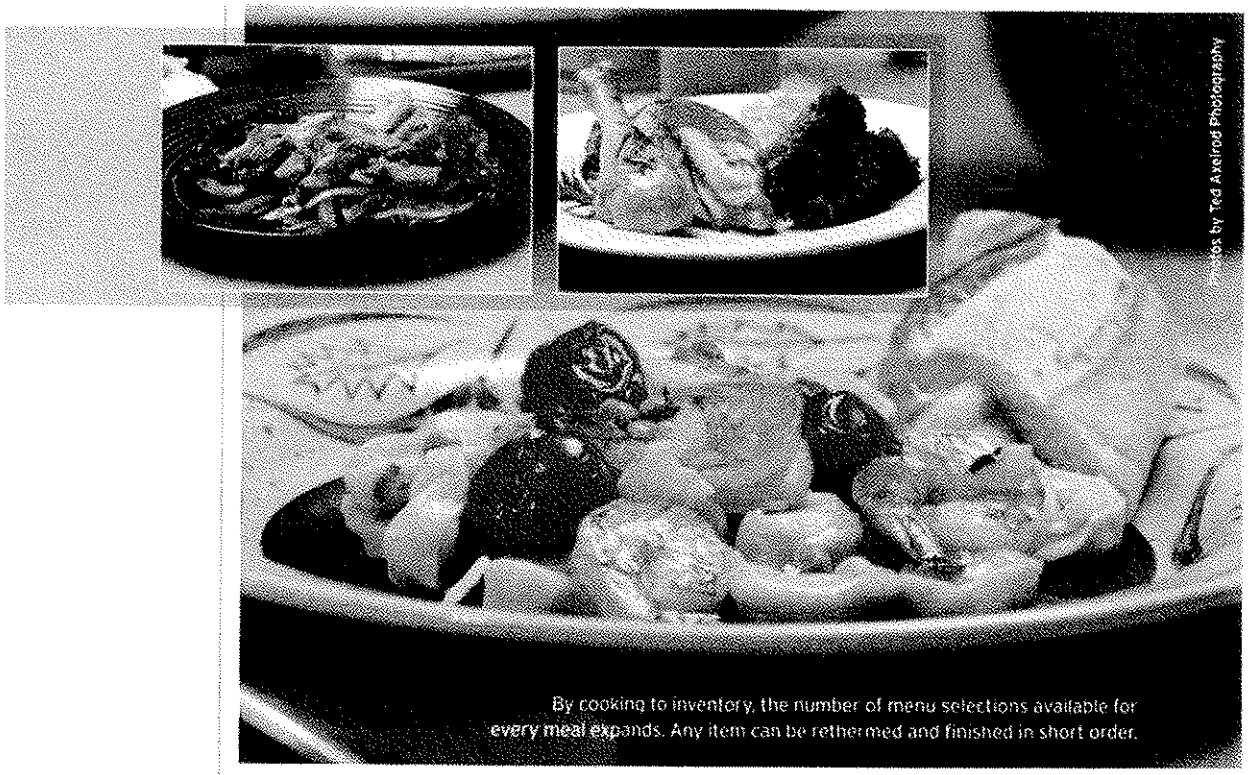
PRECISION-TEMPERATURE COOKING

For decades, cooking foods at low temperatures was a technique used by the world's top chefs. Today, mainstream foodservice applications are in the works.



Photos by Ted Axelrod Photography

By cooking to inventory, the number of menu selections available for every meal expands. Any item can be rethermed and finished in short order.

By Beth Lorenzini

We all know that foods cook to safe internal temperatures in two ways: at high temperatures for relatively short periods of time and at low temperatures for longer periods of time.

Our industry, on the whole, cooks foods at high temperatures for short periods of time, in ovens and under broilers, on a grill or griddle, in pots and pans and in fryers, for example. It's an expedient way to get food to customers. In traditional cooking, the temperature of the air or oil surrounding the food or the surface on which it cooks is *much higher* than the internal temp we need that food to reach to be considered well and safely cooked.

Low-temperature, or more accurately, precision-temperature cooking (PTC), the method embraced by world-renowned chefs, including Daniel Boulud, Joan Roca, Heston Blumenthal and Ferran Adrià, takes the lower, slower approach to cooking. The method is called *precision* temperature because it's dependent on foods cooking to precise temperatures for precise lengths of time to ensure they reach optimum flavor and texture safely.

PTC cooks foods at temperatures that are at or just slightly above the desired final, safe internal temperature the food needs to be. That means everything—from seafood, beef, chicken and pork to vegetables, potatoes, pasta, rice, eggs, legumes, you name it—cooks at a temperature within a range, typically, between 140°F to no more than 182°F. (Expert practitioners are able to cook some foods below 140°F, for example, 131°F for a rare steak, but we're not covering those techniques.) Depending on the food type and the portion size, foods will cook at these temperatures over a period of a few hours (e.g. chicken breast, salmon filet) to even a few days (e.g. short ribs, flank steak).

PTC Equipment Essentials

The main medium used to cook food at these low temperatures is water or water vapor. Water conducts heat more efficiently than air and you can precisely measure its temperature. Since immersion in water is the primary cooking method, PTC incorporates sous vide, vacuum-sealing most items in plastic in either individual portions or batch packs.

A standard PTC kitchen is equipped with a vacuum sealer, combi ovens, controlled-vapor holding ovens, lab-quality water baths set at precise temperatures, and sophisticated temp-monitoring devices.

The other key piece of equipment on the PTC roster is a blast chiller, which is critical not only to safely cool foods, but to do so with minimal damage to the food (see sidebar, right).

Finishing Touch

Finally, the PTC kitchen will carry a few high-heat pieces of equipment. High temperatures are used in PTC, but never to cook food. High-heat cooking mediums are only used to quickly *finish* foods that are already thoroughly cooked. That's the difference between high-temp and low-temp cooking.

For example, an operator might use a 600°F plancha to put a nice crust on a medium-rare steak or to brown a cooked chop. A combi set to 500°F will quickly crisp the skin of a low-temp-cooked chicken. Chefs would use a hot grill to mark cooked burgers, seafood filets or chicken breasts. In PTC, food is only exposed to these high heats for a minute or two, just to brown, crust or crisp.

Fast cook ovens, which brown and crisp in a fraction of the time it takes conventional equipment, are ideal for the PTC process, as well, according to John Knight, president of Maverick Cuisine, Waldwick, N.J. Pizzas, breaded items, toasty sandwiches—items you wouldn't retherm via a water bath, finish quickly in a fast cook oven. "And it's electric, which fits the energy profile you want in a PTC platform," he says.

Knight and his partner, wife Sarah Wally, have developed a patented Precision-Temperature Cooking System for more mainstream applications, including healthcare and commissary facilities. The patent is public and incorporates the entire process they developed from analysis to implementation, as well as equipment they custom fabricate (see sidebar, page 32).

How PTC Works

Rather than cooking food to service, PTC operations cook to inventory. So operators can buy foods

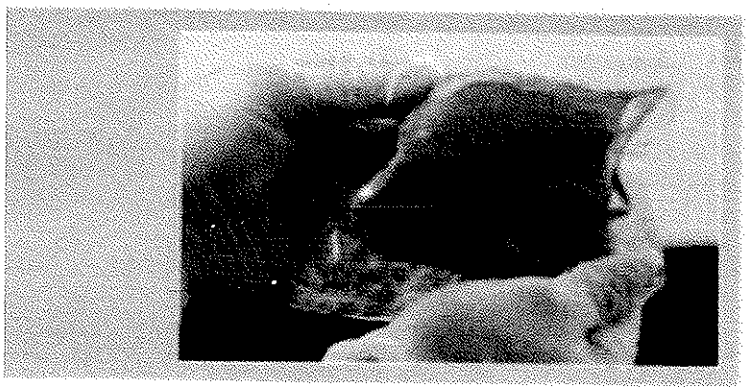
Blast Chilling Basics

Everyone knows blast chillers are the safest way to cool foods quickly—exceeding FDA Food Code guidelines. What's less known is that blast chilling also is gentle on foods.

"When you freeze a plastic bottle of water in a regular freezer, it expands—it won't stand up," says Rick Palmer, v.p., Healthcare Consulting Services, Inman Foodservice Design, Nashville, Tenn. "When you freeze a bottle of water in a blast chiller, the shape of the bottle barely changes at all, even though the contents are frozen."

When freezing liquids and solids in a traditional freezer, freezing occurs slowly, allowing macrocrystals to form in the foods. These macrocrystals can rupture foods' cell walls; that's why frozen berries are a pulpy mess after they thaw. With blast chilling, the chilling process is so fast and intense, only microcrystals have a chance to form, and they don't rupture the cell structure of the food.

An operator can blast chill any kind of meat, poultry, seafood, starch, vegetable, or fruit as delicate as raspberries, and when the items are brought back to temp or rethermed—even weeks later—they retain the same texture, moisture level, taste, tenderness and color as the day they were blast chilled.



The pouch (bottom) contains a steak fully cooked medium rare; it just requires a quick finishing on a plancha for appearance (top). Proteins cooked at low temps tenderize and retain moisture. When you slice a PTC steak, you won't see juices run; they're all in the meat.

in volume and process entire shipments in shifts. Monday, for example, might be the day the staff cuts, seasons and vacuum-packs meats into uniform portions. Tuesday could be poultry day and Wednesday, vegetable day. Chefs vacuum pack portions, cook, blast chill and store the packages in the walk-in. The goal is to have a wide assortment of already cooked menu selections ready to pull and retherm the day of service, and then finish in minutes just prior to service.

Most foods are packaged raw, but some items can be cooked to 80-percent doneness in bulk (e.g. rice, pasta), chilled and then vacuum packed, either in individual portions or multi-portion big packs. Big batches of such items as mashed potatoes, beans, grits, scrambled eggs and other items an operation might need in quantity can be gently cooked in a combi, chilled and then vacuum-packed in bulk bags.

PTC uses water or water vapor to cook foods, and to retherm them as well. So a chef in a PTC kitchen might pop 10 to 20 cooked chicken breast packets into a water bath an hour or so in advance of service. Or, the chef might clip open 25 cooked, marked burgers and hold them ready for service in the vapor oven. Water is the unifying element; PTC foods never dry out.

"Low temperatures cook foods gently and it's much easier to ensure consistent results because you simply can't overcook your menu items," says Chef Christopher Jones, The Old Collier Golf Club, Naples, Fla.

Jones, a member of the American Culinary Federation, and his staff prepare foods PTC-style for the exclusive club's members. "The flavor, juiciness, texture and nutritional integrity of the foods we cook are incredible because those essences haven't been inexpertly broiled, boiled, roasted or grilled out of the food," he explains.

Benefits Of PTC

Aside from consistency, PTC proponents list other benefits.

Cooking foods at low temperatures produces high yields: Low, slow cooking minimizes shrinkage; an operator aiming to serve a 6-oz. chicken breast can purchase 6-oz. chicken breasts. Cooking traditional style, a chef would need a 7-oz. breast to end up with a 6-oz. serving. Buyers can purchase tough cuts of meat, too, which are less expensive. Low, slow cooking renders these flavorful cuts as tender as filet.

Cooking to inventory vs. cooking to service saves labor: Operators can order foods in volume, vacuum-pack them in individual or batch packs, cook within a day or two, chill and store. This allows a chef to use most skilled (typically higher cost) labor to mass produce menu items during regular hours, minimizing overtime and weekends. Less-skilled employees can pull items from the cooler, retherm and finish items right before service.

Vacuum packing and blast chilling extends shelf life: By vacuum sealing, cooking and rapidly chilling cooked proteins, starches, vegetables, etc., the products will last for weeks in the walk-in. The same goes for uncooked, vacuum-sealed, chilled fresh fruits and other highly perishable items. PTC

reduces food waste, because chefs only pull the number of servings they need.

The kitchen's cooler, quieter: The low-wattage, electric equipment that makes up a PTC kitchen generates less ambient heat than a traditional kitchen's cook line.

Ventilation loads decrease: A PTC kitchen will likely still need a hood (as codes require), but the hood won't be running on high all day. The amount of effluent drastically reduces when foods are sealed and cooked in combis and water baths.

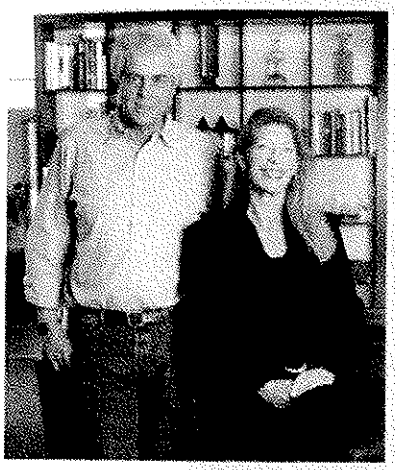
Smaller footprint: Equipment in a PTC kitchen will typically take up less space than a traditional kitchen.

Nutritional profile improves: Proponents say cooking food sous vide keeps nutrients in the food.

Maverick Cuisine Takes PTC Mainstream

Maverick Cuisine, Waldwick, N.J., started 15 years ago building custom cooking suites for top chefs, including Thomas Keller, Jean-Georges Vongerichten, Gray Kunz and Michel Richard. "They told us, 'We love your equipment, but no one understands how we cook,'" says John Knight, president, who founded Maverick Cuisine with his wife and partner, Sarah Wally.

"The chefs were referring to precision-temperature cooking. They'd been trained by the French and Spanish chefs to cook sous vide-style with low temperatures, but they couldn't find the equipment to do it here." So Maverick Cuisine created a Precision Temperature Cooking platform that includes a very specific lineup of commercial and custom equipment.



John Knight and Sarah Wally, founders of Maverick Cuisine.

"We're specific in the equipment we use in our platform because the entire concept relies on the food reaching precise, safe temperatures," Knight explains. Company choices include custom vacuum sealers, Rational and Electrolux combi ovens, Winston C-Vap holding ovens, Irinox blast chillers and MerryChef fast-cook ovens. Knight, an electronics and industrial engineer, designed the system's water baths and plancha himself.

Today, Maverick Cuisine is taking PTC mainstream with a comprehensive, systematic process. The patented Maverick Precision Temperature Cooking System (MPTCS) provides a turnkey food production program that begins with analysis of the potential client's current operations, energy, labor and production costs, a review of the current kitchen layout and equipment, and a review of the client's menu and food program.

Based on the initial analysis, Maverick Cuisine delivers a schematic of the PTC platform (comprised of an Ingredient Control Center and MPTCS where food is cooked, finished and plated) and a summary of the estimated costs and savings the operator can expect. "We identify savings at all levels, including energy, carbon emissions, HVAC loads, labor, food costs, equipment, maintenance, chemicals and water," Knight says.

From that, the company calculates an ROI. If the client signs off on the program, Maverick coordinates complete kitchen design and installation, working with the client, foodservice design consultants, architects and mechanical, electrical and plumbing engineers.

The company develops all the recipes for the operation (or adapts existing recipes to the PTC system) and installs its proprietary HACCP monitoring/documenting equipment and software program. Clients are required to purchase special temperature probes suited to sous vide packaging.

Maverick also provides start-up implementation and training with custom software and continues to consult with the operation for five years. "We're concentrating today on the healthcare foodservice segment because MPTCS is so ideally suited to room service and long-term-care dining. Southbend Memorial Hospital, Ind., will be the first hospital to use the MPTCS for its new room service program, and more healthcare systems are looking into it and signing on, according to Wally.

But the concept is as well suited to other applications, including chain restaurants where the brand relies on consistency," Knight adds. He and Wally are a great resource if you have any questions about PTC. They can be reached through their Web site, at *www.maverickcuisine.com*.