

Combi Ovens Improve Sailor Nutrition, Reduce Labor and Safety Hazards and Capitol Equipment Costs

“Combi” ovens are highly versatile ovens that cook with steam, dry heat or a combination of both. This combination of steam and dry heat, browns and crisps the exterior of foods while retaining interior moisture. The Systems Equipment and Engineering Team at Natick Laboratories demonstrated that an additional advantage of using a combi oven is the power to “Oven Fry” foods.

To “Oven Fry” popular crew favorites such as chicken nuggets or French Fries, Natick developed a cooking method that uses perforated sheet pans. The items are placed on the perforated sheet pans and cooked in the combi mode at 400° Fahrenheit. The perforated sheet pans eliminate the needing for turning the food and results in rich uniform browning.

Test results found that foods that were “oven fried” in the Combi oven mode are not only equal in flavor and acceptability to deep fat fried items but significantly lower in overall fat content. Laboratory analyses of the French Fries and chicken nuggets prepared in the combi oven mode showed that the overall fat content of items was reduced from 21 to 28 percent in comparison to items that had been deep fat fried. Navy galleys that adopt oven frying will assist in improving Sailor nutrition and help in meeting The Navy Nutrition Strategy Team (NNST) Goal to increase the proportion of sailors who consume no more than 30% of calories from fat.

Food items designed for oven frying are par-fried or have a clear-coat batter that result in a taste and texture similar to a fried product. Manufacturers typically label items suited for oven frying as “ovenable”. Items that were identified and tested at Natick include, French Fries, chicken nuggets, onion rings, fish portions, jalapeno poppers, egg rolls, breaded chicken pieces, potatoes wedges and breaded shrimp and scallops. Tests results concluded that all items could be “oven fried” at a universal temperature of 400° Fahrenheit.

Multiple items can be “oven fried” in the combi oven mode without any flavor transfer. The intermittent injection of steam and movement of hot air in the cooking cavity prevent the buildup of strong odors and flavor transfer. A menu that includes “oven fried” fish, onion rings and jalapeno poppers could all be cooked in the oven at the same time and temperature without any flavor transfer. The same menu prepared in the deep fat fryer would require increased oil filtering or maintaining separate fryers for the cooking of each item to prevent flavor transfer.

Deep fat fryers are potentially the most dangerous piece of equipment in a galley and require a dedicated mess specialist to stand in attendance when in use. Fryers may not be operated in rough seas due to safety hazards. In addition, cooking oil storage, backhauling and disposal costs are eliminated with “oven frying”.

The replacement of deep fat fryers with combi ovens represents significant savings in labor, cost and safety. The combi oven’s multifunction cook modes can be utilized not only for oven frying but to roast, bake and steam. A single combi oven can be used to replace a deep fat fryer, exhaust hood, two high pressure steamers and one standard double convection oven.