

From the Lab to the Kitchen

The Making of a Commercial Foodservice Research Project

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Temperature, firing rate, cycle time, supply pressure, taste, texture and smell. On the surface, these terms don't all seem to fit into the same category. But to a commercial foodservice (CFS) researcher, they represent the most prized possession: data. For clarity, this article combines the job descriptions of an engineer and chef under the same category of being a researcher. Just as a chef looks for the exact combination of food products, spices and cooking



As part of this commercial foodservice research project, the chef demonstrated the advantages of a steam jacketed kettle compared with using a stock pot on a range.

techniques to produce the desired dish, an engineer designing gas-fired appliances looks for the exact combination of flame shape, heat transfer and control to produce an efficient yet effective unit.

Working at the Gas Technology Institute (GTI) (www.gastechnology.org), I have the opportunity to view a research project from the perspectives of an engineer, chef and consumer. GTI, a not-for-profit research institute specializing in all things related to natural gas and energy, has long been active in the commercial foodservice industry with testing and designing various gas-fired appliances. My involvement in the commercial foodservice industry started as a side project while working on fluid mechanics and space conditioning systems.

From the engineer's perspective, research projects are about air/fuel ratios, even heat distribution, control systems, etc., with the goal of making a combustion system that has improved qualities like efficiency or emissions. As I quickly learned, the chef's and commercial foodservice operator's perspectives are different but similar to the engineer's. Chefs care about efficiency and even heat distribution too – but in terms of how well the appliance cooks the items on their menu and how much the appliance will cost to buy and operate. The most challenging, but by far the most fun part of any CFS research project, is being able to design appliances which meet the goals of both perspectives to ensure market success.

With most gas-fired appliances, if you show improved performance in the lab, the consumer is on board with pushing toward commercialization. But with CFS, the lab work is just the beginning. Over the past few years, GTI and its project sponsors (including natural gas utilities, government agencies and manufacturers) recognized that the most successful commercial foodservice gas-fired equipment research projects include participation from the CFS industry. The projects have benefited by getting the appliances in the hands of the CFS professionals to get their feedback and to fully understand their perspective about the features and performance of new equipment designs.



The steam jacketed kettle was tested at the GTI lab in accordance with ASTM standards to determine Maximum Energy Input Rate, Heatup Efficiency and Rate, Production Capacity, and the Simmer Rate.

Partnerships Provide Better Research, Better Products

An example of a project that integrates both perspectives is currently underway through a partnership with GTI, the gas industry, and Unified Brands (a CFS manufacturer). The gas industry through a UTD¹ that is actively promoting the usage of more efficient gas-fired equipment, approached GTI and asked, “Are there any appliances commercially available that are more efficient that we could assist with increasing market presence by doing demonstrations?”

With a purpose and potential funding in hand, I spoke with various CFS manufacturers and identified the Steam Jacketed Kettle currently being sold by Unified Brands under its Groen line. A jacketed steam kettle is a stock pot with a sealed chamber around the pot. Steam is injected into the chamber to evenly prepare different food products with improved energy efficiency compared to a stock pot on a range.



The Culinary School at Oklahoma State University Institute of Technology was determined to be an ideal location for a cook test conducted on the steam jacketed kettle.

After gathering performance and market information, GTI and Groen determined that a demonstration project showing the cooking performance and energy usage for the steam kettle would meet the goals of the gas industry. A project plan was developed that included laboratory testing to confirm the unit’s cooking efficiency and a field demonstration to gather usage data. The project was funded through the UTD with Oklahoma Natural Gas (ONG) as the host utility sponsor for this project. GTI and ONG developed criteria for a demonstration site and determined that the Culinary School at Oklahoma State University (OSU) Institute of Technology would be an ideal location.

Jack Conner of ONG stated, “We previously provided the school with several pieces of gas-fired cooking equipment, and since they have a major influence on the new chefs as to their preference of fuel, natural gas or electric, it was an easy decision to ask the school to test the steam jacketed kettle.”

The actual testing of the kettle began at the Residential Commercial Appliance Testing Lab at GTI. Researchers tested the kettle in accordance with ASTM standard F1785-97 (2008). The standard gives specifications on the proper testing of the kettle to achieve the Maximum Energy Input Rate, Heatup Efficiency and Rate, the Production Capacity, and the Simmer Rate.

One example of the tests conducted included filling the kettle to 90% capacity with 70° F water and turning it on



A demonstration of how the steam jacketed kettle is used and how it benefits commercial foodservice operators was performed for representatives from GTI and Oklahoma Natural Gas.

full input. Data was recorded as the water went from 85° F to 160° F. Using the gas flow rate, the change in temperature and the time taken, the heatup efficiency and rate and production capacity of the steam kettle can be calculated. Other types of tests were conducted using similar methods.

After laboratory testing, the unit was shipped and installed at OSU for demonstration of the project. In order to fully understand how the kettle is used and how it benefits commercial foodservice operations, Chefs Rene Jungo and Ron L'Heureux organized a one day cook test for representatives from GTI and Oklahoma Natural Gas.

Chef L'Heureux explained, "The advantage of cooking with a steam jacketed kettle is that there is a steady heat surrounding the product. Also the heat is not hot enough to burn the product. This is particularly useful when cooking thickened sauces, stews, gravies and soups. The rounded sides and bottom prevent products from sticking around the edges, which happens with a stock pot. This also helps when using a whisk for stirring because of the rounded nature of the whisk."

The chef also demonstrated the advantages of a steam jacketed kettle compared with using a stock pot on a range. But the real test of any commercial foodservice appliance is how well it cooks. To test this, the Chef and students at OSU prepared a Duck and Andouille Sausage Gumbo that was thoroughly evaluated by the researchers from GTI and ONG. After the one day cook test, the unit will be tested at OSU for three more months. Data being recorded includes

operational hours and dishes prepared. When the test ends, the chefs and students will fill out usage surveys to assist the gas industry and the manufacturer in preparing information for marketing the unit.

The gas industry's support for demonstration projects of new gas-fired commercial foodservice equipment has grown in recent years for many reasons. As shared by representatives from Oklahoma Natural Gas, benefits are gained by both the suppliers and users of natural gas.

Kasey Wade of ONG says, "This type of demonstration project gives me a better understanding of natural gas foodservice equipment which in turn helps me provide beneficial information to my customers."

Teresa Scott from ONG added that from the perspective of the natural gas equipment user, there are benefits, "Students, who will become future chefs or restaurateurs, not only experience the benefits of cooking with natural gas equipment but also experience food preparation on natural gas equipment with the highest level of technology."

Despite having unique perspectives, all parties involved in any commercial foodservice research project have the same basic goal of bringing to market the latest and greatest gas-fired commercial foodservice appliances; the gas industry wants to promote them, engineers want to design them, manufacturers want to sell them and chefs want to cook with them.

In the words of Chef L'Heureux, "I prefer to cook with gas over electric. Gas provides instant heat on and instant heat off on stovetop applications. In ovens and fryers, gas has a better heat recovery time. On griddles, there seems to be a better dispersion of the heat providing a more even cooking temperature throughout the griddle."

Now that's cooking (and researching) with gas. 

To learn more about other innovative and thoroughly researched natural gas-fired commercial foodservice equipment, visit www.gfen.com

¹Utilization Technology Development Company (UTD) is a member-controlled partnership of natural gas distribution companies formed to conduct near-term applied research and to develop, test, and deploy environmentally-friendly, energy-efficient, end-use technologies.