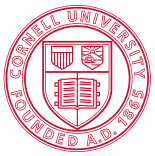

Cornell University
New York State Agricultural Experiment Station

Steam Kettles in Food Processing

Fact Sheets for the Small Scale Food Entrepreneur

Published by:
The Northeast Center for Food Entrepreneurship at the New York State Food Venture Center, Cornell University,
http://www.nysaes.cornell.edu/necfe/
This publication is for educational purposes only. 05/06

Steam Kettles in Food Processing

One of the most common food equipment pieces in small scale processing is the steam kettle. It is also used in restaurants and large institutional kitchens.

Design: The design of the steam kettle makes heating and cooking very efficient and fast. The typical kettle looks very familiar: a large container with a round or spherical bottom, reminiscent of the old cauldron. Kettles have a double wall or "jacket" covering the bottom and at least half the height of the sides, to provide space for steam to circulate, thereby heating the cooking surface. In principle, the steam kettle operates like the average kitchen double boiler.

Function: The use of steam as the heating medium has many advantages: uniform heating, rapid heat transfer and easy control of the heating rate through a steam valve. Steam can be supplied to the kettle by an independent boiler through a pressurized pipe or it can be produced in-situ for immediate use, as is the case with so-called "self-contained steam kettles". Self-contained kettles heat water with electric energy (electric steam kettles) or with gas (gas fired steam kettles) to generate steam under pressure. In all cases, the temperature of the steam is dependent on the pressure inside the steam jacket: the higher the pressure the higher the temperature. Most kettles are rated at 50 psi as the maximum pressure although some are rated lower to about 35 psi.

Options: In large food companies where boilers are standard equipment, direct steam kettles are normally preferred while small processing plants that do not have boilers can rely on self-contained kettles. A wide variety of sizes and options complement the choice: from 0.5 gallons to 200+ gallons, one piece (lift-off) or two piece covers, tilting capability, draining valves in different types and sizes, strainers, baskets and agitators for custom applications.

Material: Virtually all food steam kettles are made of stainless steel, a trade name given to corrosion resistant steel, and the number one choice material for construction of food equipment. Normally stainless steel contains no more than 0.7 % carbon and as much as 20 % chromium. There are two types of stainless steel commonly used for steam kettles: 304 and 316. The numbers designate the chemical composition of the material describing the percentage of steel (66.5 to 74 %), chromium (17 to 19 %), nickel (9 to 12 %), carbon (0.03 to 0.10 %), and molybdenum (0 to 2.5 %). Stainless steel 304 is the standard option. However, stainless steel 316 is the material of choice if you are working with high acid and acidified foods since it offers more resistance to hot acid foods for a relatively modest price increment.

Price: New steam kettles range in price depending on size, type and options starting at about $2,000 for very small direct steam models and reaching $20,000+ for the larger versions. It is possible to get a used kettle in good condition for a fraction of the original cost from most dealers of used food processing equipment or food service distributors. Some suppliers are listed below.

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References

Imholte, T.J. 1984. Engineering for food safety and sanitation-a guide to the sanitary design of food plants and food plant equipment. Technical Institute of Food Safety, Minnesota, USA.

New Equipment

Cleveland Range, Inc.
1333 East 179th St.
Cleveland, OH 44110
800-338-2204
www.clevelandrange.com

Groen, A Dover Industries Co.
1900 Pratt Blvd.
Elk Grove Village, IL 60007-5906
847-439-2400
http://difc.difoodservice.com

Lee Process Systems and Equipment
Division of Lee Industries, Inc.
P.O. Box 687
Philipsburg, PA 16866
814-342-0460
www.leeind.com

Used Equipment

Alard Equipment Corp.
6483 Lake Ave.
P.O. Box 57
Williamson, NY 14589-0057
315-589-4511
www.alard-equipment.com

Cuyler Associates Inc.
468 Salt Rd.
Webster, NY 14580-9719
585-265-0715
www.foodmachinery.com

Production, Packaging & Processing Equipment Co.
1450 E. Van Buren St.
Phoenix, AZ 85006-3522
602-254-7878
www.kettles.com

Keith Machinery Corp.
34 Gear Ave,
Lindenhurst, NY 11757
516-957-1200

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