Inspections, Compliance, Enforcement, and Criminal Investigations

Steam Distribution for Retort Venting in Food Canneries

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DEPT. OF HEALTH, EDUCATION, AND WELFARE PUBLIC HEALTH SERVICE FOOD AND DRUG ADMINISTRATION *ORA/ORO/DEIO/IB*

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Related Program Areas:
Food Canneries

SUBJECT: STEAM DISTRIBUTION FOR RETORT VENTING IN FOOD CANNERIES

Following is a brief description of some points to consider when evaluating the adequacy of the steam supply for venting the retorts in food canneries using batch-type retorts for cooking. Observation of any one or more of three critical points: low retort header pressure, undersized retort header, or use of a vent schedule shorter than recommended for the installed steam inlet size, provides ample reason for concern and collection of detailed data from several successive retort cycles. Header Pressure: After inspecting the boiler-room or power plant, it is desirable to follow the main steam header into the cannery. Steam is required, in a typical plant, at two distinctly different pressures; at approximately 90 psi, and at approximately 15 psi. Generally, steam at 90 psi is required only for venting the retorts, \1\, \2\, \3\, while steam at approximately 15 psi is required for almost all other equipment, such as washers, caustic peelers, blanchers, exhaust boxes, vacuum sealers, syrup tanks, hot water heaters, space heaters, and for the cooking portion of the retort cycle. \3\ A well designed plant will have an 80 to 100 psi header branch carrying steam directly from the main header to the retorts, and another branch header on which is installed a pressure reducing valve and a safety relief valve, carrying 15 to 30 psi steam to all other steam consuming equipment. Header Pipe Size The authorities cited above (\1\, \2\, \3\) specify the following minimal retort header pipe sizes:

number of Retorts Venting Simultaneously	Vertical & Horizontal Retorts Less Than 15'Long	Horizontal Retorts Over 15' Long -
1	2 inches	2 - 2-1/2 inches
2	2-1/2 inches	3 - 3-1/2 inches
3	3 inches	3-1/2 - 4 inches
4	3-1/2 inches	4 - 5 inches

Two inspection problems are anticipated; the steam header will usually be covered with insulation, and these nomina pipe sizes do not correspond to either the inside or outside actual diameters of the pipe. Close examination of the length of the header will almost certainly reveal a location where the pipe itself can be seen and measured. The following table gives actual outside diameters corresponding to nominal pipe diameters. All ordinary steel pipe used fc water or steam service in food plants will be either schedule 40 or schedule 80 (wall thickness) and either schedule is made to the same outside diameter.

Nominal Pipe Diameter Inches	Actual Outside Diameter Inches
1	1.315
1-1/4	1.660
1-1/2	1.900
2	2.375
2-1/2	2.875
3	3.500
3-1/2	4.000
4	4.500

5	5.563

Venting Schedules The venting schedules recommended by Lopez \3\ and by Continental Can \2\ depend upon the size of the steam inlet into each individual retort, from a minimum of 1 inch up to a maximum of 2 inches. NCA \1\ recommends only a venting schedule for a retort equipped with a minimum 1 inch steam inlet. Presumably, NCA recognizes that larger steam inlets may be used, but is unwilling to recommend shorter venting schedules without experimentation on the particular retort installation. Reference to these authorities should be made for detailed venting schedules. At the conclusion of the venting operation the steam flow entering the retort is throttled down to a pressure (typically 10-15 psi) corresponding to the desired cooking temperature, and the cooking schedule is begun. Maintenance of this temperature by controlling the pressure (directly or indirectly) is extremely important throughout the cook cycle. This is done in a variety of ways and will be discussed in a subsequent ITG. \1\Processes for Low-Acid Canned Foods in Metal Containers, Bulletin 26-L, National Canners Association, Washington, D. C. 20036. \2\Retorts for Canning, Bock, J.H., Continental Can Co., Inc., Chicago, Illinois. \3\A Complete Course in Canning, Lopez, Anthony; The Canning Trade, Inc., 2619 Maryland Avenue, Baltimore, Maryland 21218.

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