

## A tale of two 2-pipe steam systems in St. Louis and Washington, D.C.

**T**he building owner/operator of the Mark Twain Hotel in St. Louis is very pleased with performance and savings to date (since the installation of radiator inlet orifices as prescribed in “How to Make a Two-Pipe Steam Heating System Really Work” by Henry Gifford, June 2003). We will report figures for steam consumption on a monthly basis throughout the 2003 and 2004 heating season, along with data from prior years to model actual savings realized.

Building details:

- Eight floors, masonry construction, built in 1907.
- 235 guest rooms, average occupancy rate 95 percent.
- Commercial spaces on first floor.
- Building heat and domestic water heating via district steam system which are metered separately.
- Steam system supplied in timed

cycles based on outdoor temperature.

Problems prior to steam inlet-orifice installation:

- Traps had failed evidenced by live steam blowing from system air vent in basement.
- Steam consumption excessive for building size.
- Poor temperature control—overheating of some rooms occurring, windows open in winter while others complaining of insufficient heat.

The inlet orifice installation was completed late September 2003. All cast-iron (high mass) radiators had orifices installed. Observations to date:

- Trap problems no longer evident, no steam venting into basement, and area surrounding system vent now cool and dry.
- Temperature control greatly improved—no open windows, and few complaints about cooler room tem-

peratures, but no rooms found to be cold. In the isolated instances of rooms being too cool, the next size larger orifices have been installed, which resolved the problem.

- First few sections of the radiators on steam inlet side now get hot, while remaining sections are warm, but not excessively hot. All steam is being condensed without pressurizing the radiator.

- The system pickup steam-flow rate prior to orifice installation was approximately 7,800 pph for 5 to 8 min and approximately 3,500 pph when stabilized. System pickup flow rate is now approximately 4,500 ppm for 2 to 5 min (occasionally less than 2 min) while stabilized flow rate is 1,800 ppm.

- Steam consumption in Nov. 2003, compared with Nov. 2001, was down 31.7 percent. When compared with Nov 2000, it was down 58.8 per-

cent on a degree-day (DD) basis.

Calculation of savings in November 2003 compared with November 2000 and 2001 (note: MLBS = 1,000 lb of steam):

Nov 2000: MLBS steam = 557, DD = 564 = .987 MLB/DD.

Nov 2001: MLBS steam = 210, DD = 352 = .596 MLB/DD.

Nov 2003: MLBS steam = 191, DD = 470 = .407 MLB/DD.

Therefore,  $.407/.596 = 68.3$  percent, or a 31.7-percent reduction in the amount of steam used for heating, and  $.407/.987 = 41.2$  percent, or a 58.8-percent reduction in the amount of steam used for heating.

Note that the Nov. 2002 steam bill was not available when this letter was prepared. The building heat consumption (steam) was factored from the November 2000 and 2001 steam bills by comparing the last four years' usage for months just prior to and following the heating season. Steam was not metered separately for the domes-

tic water and building heat at that time. Starting in early 2003, meters have been read separately and will allow direct comparison with the prior year for building steam usage for heating. (This data will be published in the next issue of *BSE*.) Also, note that the Nov 2003 steam bill was for a total of 285.5 MLBS: The domestic water steam meter read 94.3-MLBS flow, while the building heat meter read a total of 191.2 MLBS for the period.

This is the report to date. We will send additional data as it is developed. Thanks for the idea and your interest.

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I would have liked to have gone the orifices route to remedy the hammering in the steam pipes in our 50-unit, 54-year-old co-op apartment building. I did some rough estimates of approximate costs to put your sug-

gestions into practice. The board of directors didn't like the price of anything. Board members apparently understood little (and have little interest), despite my carefully written descriptive memos and oral presentations. (What is of interest to them is replacing our building's front steps at a cost of perhaps \$25,000. Management has taken an interest in the steps project.)

What did happen was that the board of directors, with management concurrence, decided to have the present boiler pressure control reset so that the boiler would operate at 2 lb rather than 4. That was done at the start of the current heating season. The result has been an insignificant reduction in hammering, which is disappointing. Perhaps I can raise (the orifice option) again at some time in the future.

*Anonymous  
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