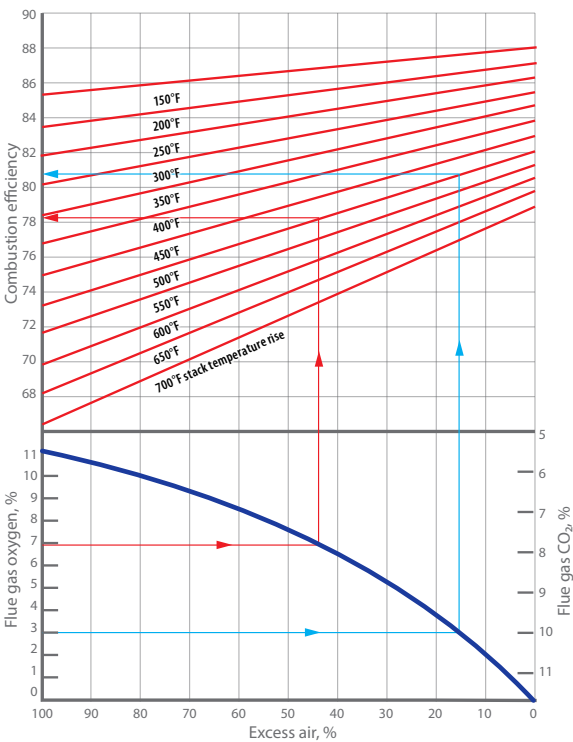


# Steam System *Cheat Sheet*

## Top 10 Energy Conservation Measures

1. Inspect and repair steam traps
2. Insulate steam distribution and condensate return lines and cover heated, open vessels
3. Install a condensing economizer
4. Use feedwater economizers for waste heat recovery
5. Minimize boiler blowdown
6. Recover heat from boiler blowdown
7. Replace pressure-reducing valves with backpressure turbogenerators
8. Use low-grade waste steam to power absorption chillers
9. Upgrade boilers with energy-efficient burners
10. Improve boiler's combustion efficiency

## Natural Gas Combustion Efficiency Curve



Source: *Energy Management Handbook, 4th Edition, Fairmont Press 2001*

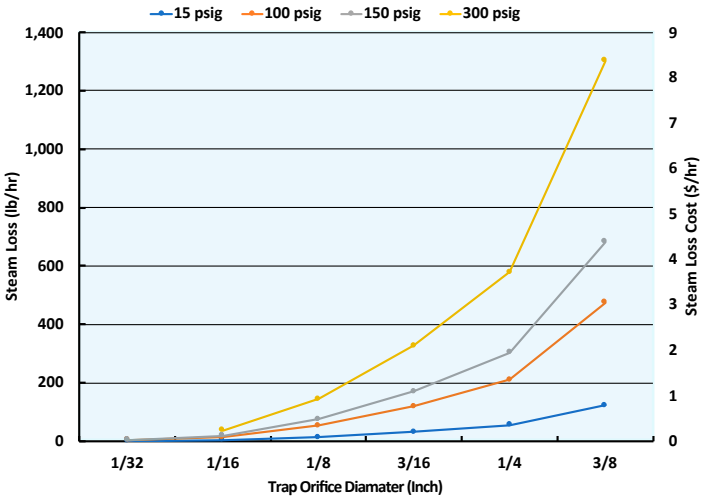
## Rules of Thumb

1. Every 40°F increase in the combustion air temperature improves efficiency by roughly 1%
2. Every 40°F increase in stack temperature results roughly 1% efficiency loss

[betterbuildingsolutioncenter.energy.gov](http://betterbuildingsolutioncenter.energy.gov)

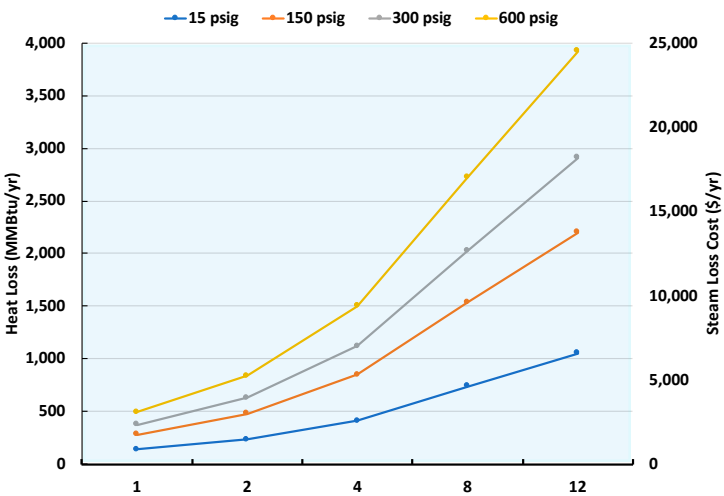
# Steam System Cheat Sheet

## Leaking Steam Trap Discharge Rate and Cost



\*Based on Natural Gas unit rate of \$0.5/therm and boiler efficiency of 80%.

## Heat Loss Per 100 Feet of Uninsulated Steam Line



\*\*Based on Natural Gas unit rate of \$0.5/therm and boiler efficiency of 80% and 8,760 operating hours per year.

## Resources

1. Steam System Modeler Tool (SSMT) by US DOE
2. Steam System Scoping Tool (SSST) by US DOE
3. Insulation tool - 3EPlus by Insulation Institute
4. Improving Steam System Performance: A Sourcebook for Industry by US DOE
5. Steam System Survey Guide by US DOE
6. Steam Tip Sheets by US DOE