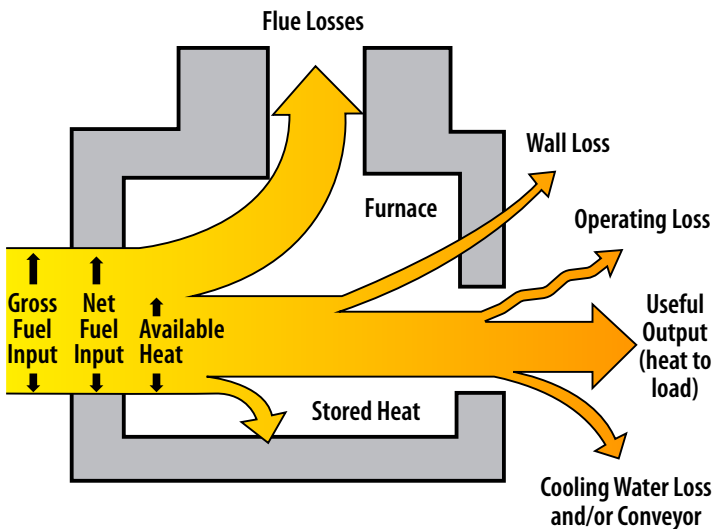


Process Heating System *Cheat Sheet*

Top 10 Energy Conservation Measures

1. Check Burner Air to Fuel Ratios
2. Oxygen-Enriched Combustion
3. Check Heat Transfer Surfaces
4. Reduce Air Infiltration in Furnaces
5. Furnace Pressure Controllers
6. Reduce Radiation Losses from Heating Equipment
7. Install Waste Heat Recovery Systems for Fuel-Fired Furnaces
8. Preheated Combustion Air
9. Load Preheating Using Flue Gases from a Fuel-Fired Heating System
10. Using Waste Heat for External Processes

Energy Loss Diagram in a Fuel-Based Process Heating System



Resources for Industry

- Improving process heating systems performance: A Sourcebook for Industry
- Process heating assessment and survey tool (PHAST)

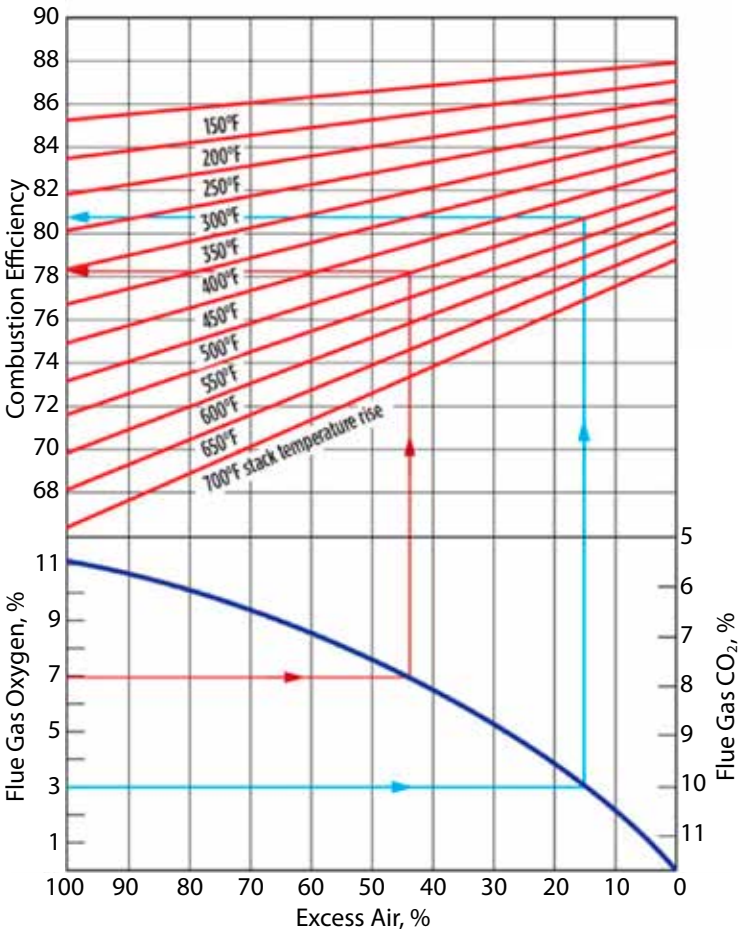
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Process Heating System *Cheat Sheet*

Percent Fuel Savings Gained from Using Preheated Combustion Air

Furnace Exhaust Temp (F)	Preheated Air Temperature (F)					
	600	800	1,000	1,200	1,400	1,600
1,000	13%	18%	NA	NA	NA	NA
1,200	14%	19%	23%	NA	NA	NA
1,400	15%	20%	24%	28%	NA	NA
1,600	17%	22%	26%	30%	34%	NA
1,800	18%	24%	28%	33%	37%	40%
2,000	20%	26%	31%	35%	39%	43%
2,200	23%	29%	34%	39%	43%	47%
2,400	26%	32%	38%	43%	47%	51%

Natural Gas Combustion Efficiency Curve



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