High Efficiency

Fred Heinecke

Bill Hagan

Tank Type

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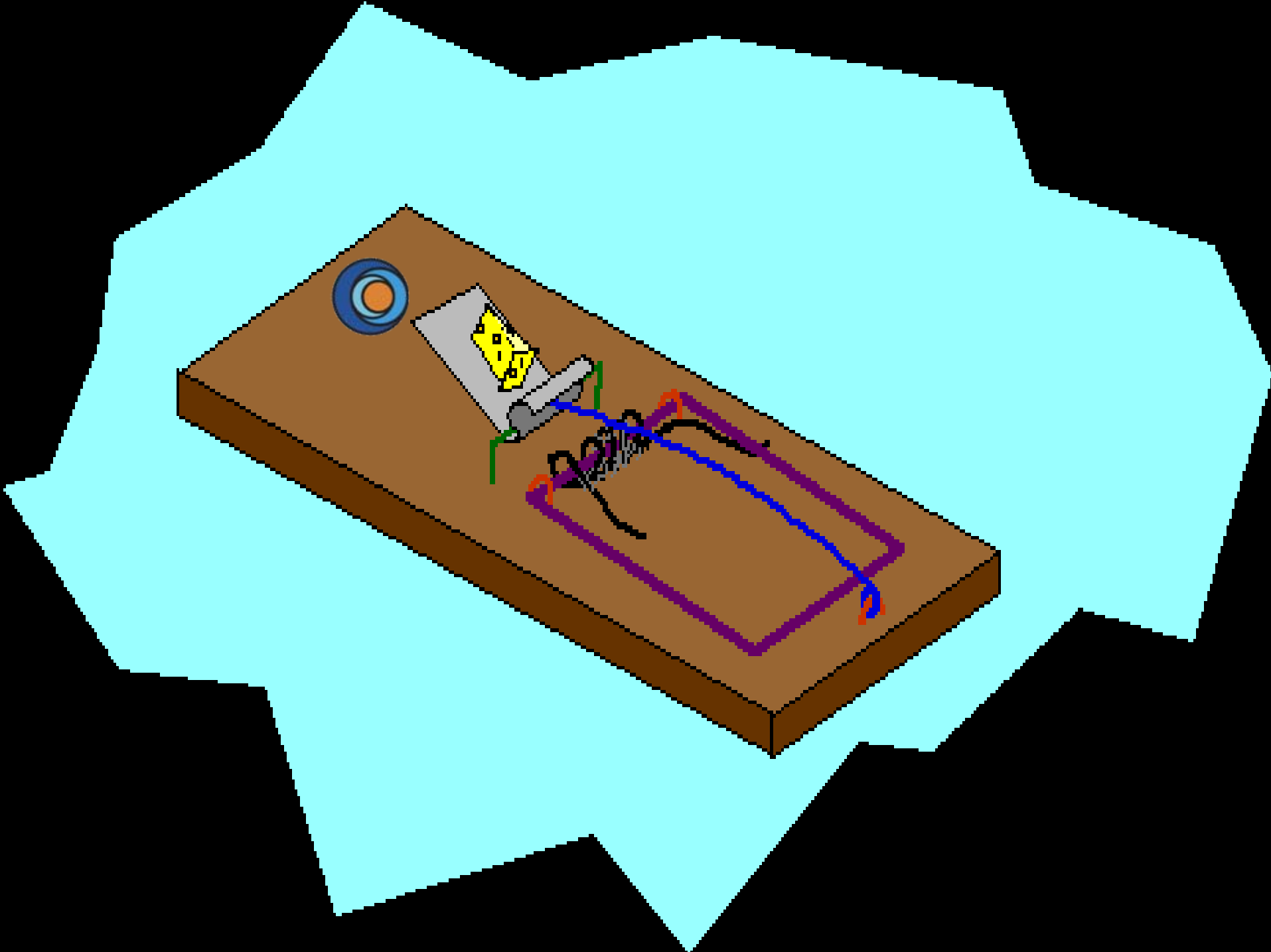
Water Heaters

Frank Manzella



Types of Efficiency

- Combustion
- Thermal
- Recovery
- Draw
- Standby

What is Thermal Efficiency?

- Thermal Efficiency - The percentage of heat produced by the burner that ends up in the water.

  – Example: 80% Efficiency means that on a 100,000 Btu/h water heater 80,000 Btu/h goes into the water

  (100,000 x .80 = 80,000)

Defining High Efficiency…

There is no specific definition (with regard to water heaters)….

“High Efficiency” depends on the product and sector

- Solar - 40%
- Electric – 95%
- Gas – 90%+

The market/specifier/manufacturer defines “High Efficiency”

Anything can be “called” High Efficiency

How State Defines High Efficiency

The heater must transfer enough heat into the water to produce condensation at **any temperature** within it's operating range.

“The” Formula

If a BTU is the amount of heat required to raise one pound of what 1 degree then:

$$\text{GPH Recovery} = \frac{\text{Btu/H x Efficiency}}{8.25 \text{ x rise}}$$

Finding Efficiency in Product Specs

MODEL NUMBER	BTU INPUT PER HOUR	Gallons or Litres	TANK SIZE	FIRST HOUR RATING	GPH or LPH	RECOVERY – GALLONS OR LITRES PER HOUR AT DEGREE RISE		
						40°F 22°C	100°F 56°C	140°F 78°C
SBD81 199NE	199,000	U.S. Gallons	81	263	GPH	461	184	132
		Litres	306	995	LPH	1745	697	500
SBD100 199NET	199,000	U.S. Gallons	100	263	GPH	482	193	138
		Litres	379	995	LPH	1825	731	522
SBD81 199NE	199,000	U.S. Gallons	100	241	GPH	482	193	138
		Litres	379	912	LPH	1825	731	522
SBD100 199NES (A)	199,000	U.S. Gallons	100	263	GPH	482	193	138
		Litres	379	995	LPH	1825	731	522
SBD100 250NE (A)	250,000	U.S. Gallons	100	312	GPH	606	242	173
		Litres	379	1181	LPH	2294	918	655

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$$193 = \frac{199{,}000x}{8.25 \times 100} = 80\%$$

What difference does it make?

38 GPH

GPH Recovery = $\frac{\text{BTU/H} \times \text{Efficiency}}{8.25 \times \text{rise}}$

$\frac{199{,}000 \times 95\%}{8.25 \times 100}$ = **230 GPH**

$\frac{199{,}000 \times 80\%}{8.25 \times 100}$ = **192 GPH**

Real input is 189,050 Btu/h VS. 159,200 Btu/h

What difference does it make?

BTU/H	Efficiency	Recovery	Efficiency	Recovery	Difference
120,000	95%	138	80%	116	22 GPH
199,000	95%	230	80%	192	38 GPH
250,000	95%	287	80%	243	44 GPH
300,000	96%	349	80%	291	58 GPH
399,900	96%	465	80%	388	77 GPH

Solutions/Limitations

- Significant decrease in operating cost
- Eliminates need for make-up air from inside
- Flexible venting solutions
- “0” Clearance installation
- Vents with PVC

- Vent length has limit
- Higher initial cost (product only).

How does ***High Efficiency*** help my client?

- Assume 80% Efficiency vs. 95% Efficiency
  - That's in increase of 16% (.80/.95 = 16%)
  - If there are 365 days in a year
  - 16% of 365 is 58
  - That's like getting 2 months of water heating free!

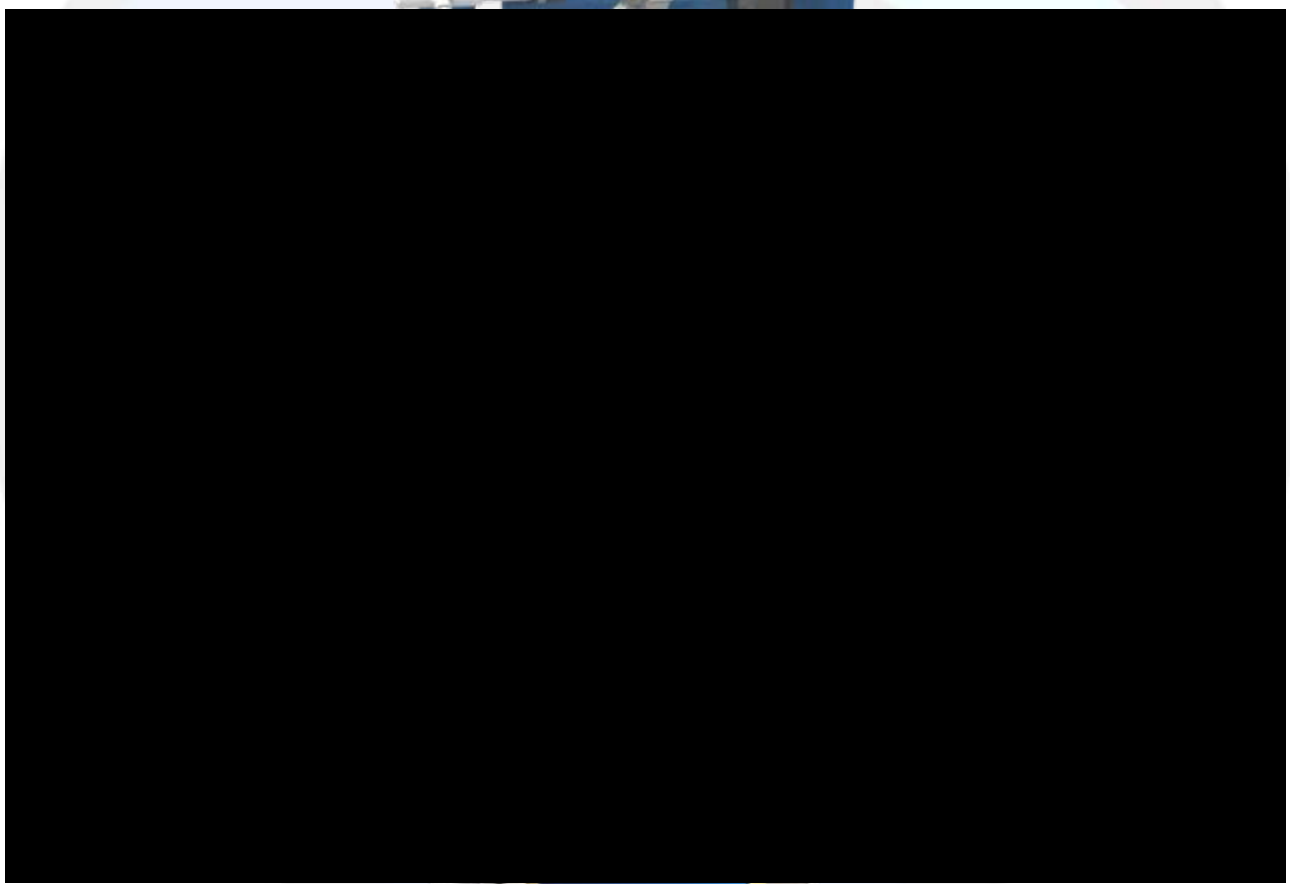
How do we go from 80% to 90+ %?

A brief exercise…..

How do we
80% to 9

- Squeezing the most out of fuel requires a secondary heat exchanger.

SUF Series



W.T. LEONARD & ASSOCIATES

Questions?

state WATER HEATERS