The University of Georgia
Cooperative Extension Service
College of Agricultural and Environmental Science/Athens, Georgia 30602-4356

Poultry Housing Tips

Determining Daily Fuel Usage From Brooder/Furnace Runtime

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Many new controllers have the ability to keep up with the amount of time each of the heating outputs or zones has operated in the past 24 hour period. The question many producers have is, "How do I convert brooder/furnace operating hours into gallons of propane used?". The following formulas should prove helpful in answering this question:

For pancake brooders (30,000 Btu's/hr):

$$\text{Gallons of propane} = \frac{\text{Number of brooders in the zone} \times 30{,}000 \times \text{number of hours operated}}{96{,}000}$$

For radiant brooders (40,0000 Btu's/hr):

$$\text{Gallons of propane} = \frac{\text{Number of brooders in the zone} \times 40{,}000 \times \text{number of hours operated}}{96{,}000}$$

For forced air furnaces (200,000 Btu's/hr):

$$\text{Gallons of propane} = \frac{\text{Number of furnaces in the zone} \times 200{,}000 \times \text{number of hours operated}}{96{,}000}$$

Notes:

1) Burning one gallon of propane produces 96,000 Btu's of heat
2) If your brooder or forced air furnace has a different heat output from those listed above simply change the heat output in the formula by the value specified by your brooder /furnace manufacturer.
3) If you are using natural gas and you want to know how many therms you used, you can convert gallons to therms by dividing gallons used by 1.09

Example:

500' broiler house with 14 radiant brooders in the brooding area divided into three groups or zones:
five brooders on heat zone 1 (near tunnel curtain)
four brooders on heat zone 2 (center of brooding end of the house)
five brooders on heat zone 3 (near brooding curtain)

The controller indicates heating outputs ran the following number of hours during the last 24 hours:

Heat output 1 = 2 hours 10 minutes
Heat output 2 = 1 hour 15 minutes
Heat output 3 = 1 hour 41 minutes

How much gas was burned in the past 24 hours?

First you need to convert hours and minutes into fraction of hours.
Heat output 1 = 2 hours 10 minutes = 2 + 10/60 = 2.17 hours
Heat output 2 = 1 hour 15 minutes = 1 + 15/60 = 2.25 hours
Heat output 3 = 1 hour 41 minutes = 1 + 41/60 = 1.68 hours

From the above equation for radiant brooders:

$$\text{Gallons of propane} = \frac{\text{Number of brooders in the zone X 40,000 X number of hours operated}}{96{,}000}$$

$$\text{Heat output 1} = \frac{5 \text{ X } 40{,}000 \text{ X } 2.17}{96{,}000} = 4.52 \text{ gallons}$$

$$\text{Heat output 2} = \frac{4 \text{ X } 40{,}000 \text{ X } 2.25}{96{,}000} = 3.75 \text{ gallons}$$

$$\text{Heat output 3} = \frac{5 \text{ X } 40{,}000 \text{ X } 1.68}{96{,}000} = 3.5 \text{ gallons}$$

Total gallons used = 4.52 + 3.75 + 3.5 = 11.77 gallons

One aspect of fuel usage that controllers will not keep up with is the fuel burned by brooder/furnace pilot lights. Fuel burned by pilot lights over a 24 hour period can be determined by the following equation:

$$\text{Gallons of propane per day} = \frac{\text{Number of brooders X 1,200 Btu's/hr X 24 hours}}{96{,}000}$$

Example:
How much gas do the pilot lights of 26 pancake brooders burn each day?

$$\text{Gallons of propane per day} = \frac{26 \text{ X } 1{,}200 \text{ Btu's/hr X } 24 \text{ hours}}{96{,}000} = 7.8 \text{ gallons per day}$$

Michael Czarick
Extension Engineer
(706) 542-9041 542-1886 (FAX)
mczarick@engr.uga.edu
www.poultryventilation.com

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