CALCULATION OF ECONOMIC BALANCE POINT

The Economic Balance Point for the Series II Heat Pump is the point where, above that temperature, the heat pump is more economical than the fossil fuel furnace and, below that temperature, the fossil fuel furnaces is more economical than the heat pump.

The following formula, example, and graphs are provided to assist in the calculation of the Economic Balance Point. All of the following values, except for the value of K, may vary from the values in the example depending on the location of the installation, the heat pump size, and the furnace size and type of fossil fuel used.

FORMULA:

$$T = 47 - 30 \left[\frac{COP_{47} - \frac{BFE}{CK}}{COP_{47} - COP_{17}} \right]$$

Where:

T = Economic Balance Point
COP_{47} = Coefficient of Performance for the heat pump at 47° F.
COP_{17} = Coefficient of Performance for the heat pump at 17° F.
K = 3412 BTU/KW
F = Furnace Efficiency (AFUE)
E = Cost of Electricity ($/KWHR)
C = Cost of Fossil Fuel ($/Unit)
B = BTU/Unit of Fossil Fuel

Natural Gas = 100,000 BTU/Ft.^{3}
LP = 91,600 BTU/Gal.
Oil = 139,000 BTU/Gal.

EXAMPLE:

COP_{47} = 2.50
COP_{17} = 1.70
K = 3412 BTU/KW
F = .60 (AFUE = 60%)
E = $ 0.05/KWHR
C = $ 0.46/100 Ft.^{3}
B = 100,000 BTU/100 Ft.^{3} (Natural Gas)

$$T = 47 - 30 \left[\frac{\frac{100{,}000 \times .6 \times .05}{.46 \times 3412}}{2.50 - 1.70} \right]$$

$$= 47 - 30 \left[\frac{\frac{3000}{1570}}{.80} \right]$$

$$= 47 - 30 \left[\frac{2.50 - 1.91}{.80} \right]$$

$$= 47 - 30 \left[.738 \right]$$

$$= 47 - 22.1$$

$$T = 25^\circ \text{ F.}$$