

47-7575 RATE OF FLOW FOR HEATING
USE ANALYSIS BY C. SKINNER 5/17/2005
(BASED ON APPLICATION PROCESSING MEMO #23 (AMENDED))

PER TELECOM WITH MARY KIENEEN (PERMIT HOLDER)

SINGLE STORY HOUSE $\approx 3700 \text{ ft}^2$ + HEATED GARAGE $\approx 625 \text{ ft}^2$ (uninsulated)

FIND BTU's for house & garage

house $E = [.67 \cdot 66^\circ] 3700$

$E = 163,614 \text{ BTU/hour}$

garage $E = [1.11 \cdot 66^\circ] 625$

$E = 45,787.5 \text{ BTU/hour}$

$E = [e \cdot \Delta T] \times \text{Area}$

$e = .67$ average residence

$e = 1.11$ poor energy efficiency (garage)

$\Delta T = (t_i - t_o) = (70^\circ - 4^\circ) = 66^\circ$
↑ BOISE

FIND TEMPERATURE DROP ACROSS SYSTEM

$\Delta T_s = 0.3(s - t)$ where $s = \text{source temp } (89.6^\circ \text{ per } 12/28/82 \text{ exam notes})$

$\Delta T_s = 0.3(89.6 - 70)$ $t = \text{inside temp (use } 70^\circ)$

$\Delta T_s = 5.88^\circ \text{F}$

FIND FLOW RATE

$\text{RATE} = \frac{E}{500(\Delta T_s)} = \frac{163,614}{500(5.88)} = 55.65 \text{ gpm}$
(in gpm)

$= 0.12 \text{ cfs for house}$

$\frac{45,787.5}{500(5.88)} = 15.57 \text{ gpm}$

$= 0.03 \text{ cfs for garage}$

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47-7575 HEATING VOLUME ANALYSIS

BY C. SKINNER 5/17/2005

$$\text{Volume} = \frac{HL * DD * 24 * C_D}{\Delta t_1 * K * C * \Delta t_2}$$

where

$$\Delta t_1 = \text{inside minus outside temp} = 70^\circ - (-3^\circ) = 73^\circ \text{F}$$

$$HL = \text{peak heat load required} = 32 \text{ for home, } 46 \text{ for garage (in BTU/hour per ft}^2\text{)}$$

$$DD = \text{annual heating degree days} = 6146$$

$$C_D = 0.6$$

$$K = 0.90$$

$$C = 2.72 \times 10^6 \text{ (unit conversion to give V in acre-feet)}$$

$$\Delta t_2 = \text{temp drop across system use } 5.88^\circ (\Delta T_s) \text{ for home \& } 3.6^\circ \text{ for garage}$$

from 12/28/82 field notes

$$\text{Volume for home} = \frac{32(3700)(6146)(24)(.6)}{(73)(0.90)(2.72 \times 10^6)(5.88)} = 9.97 \text{ ac-ft for home}$$

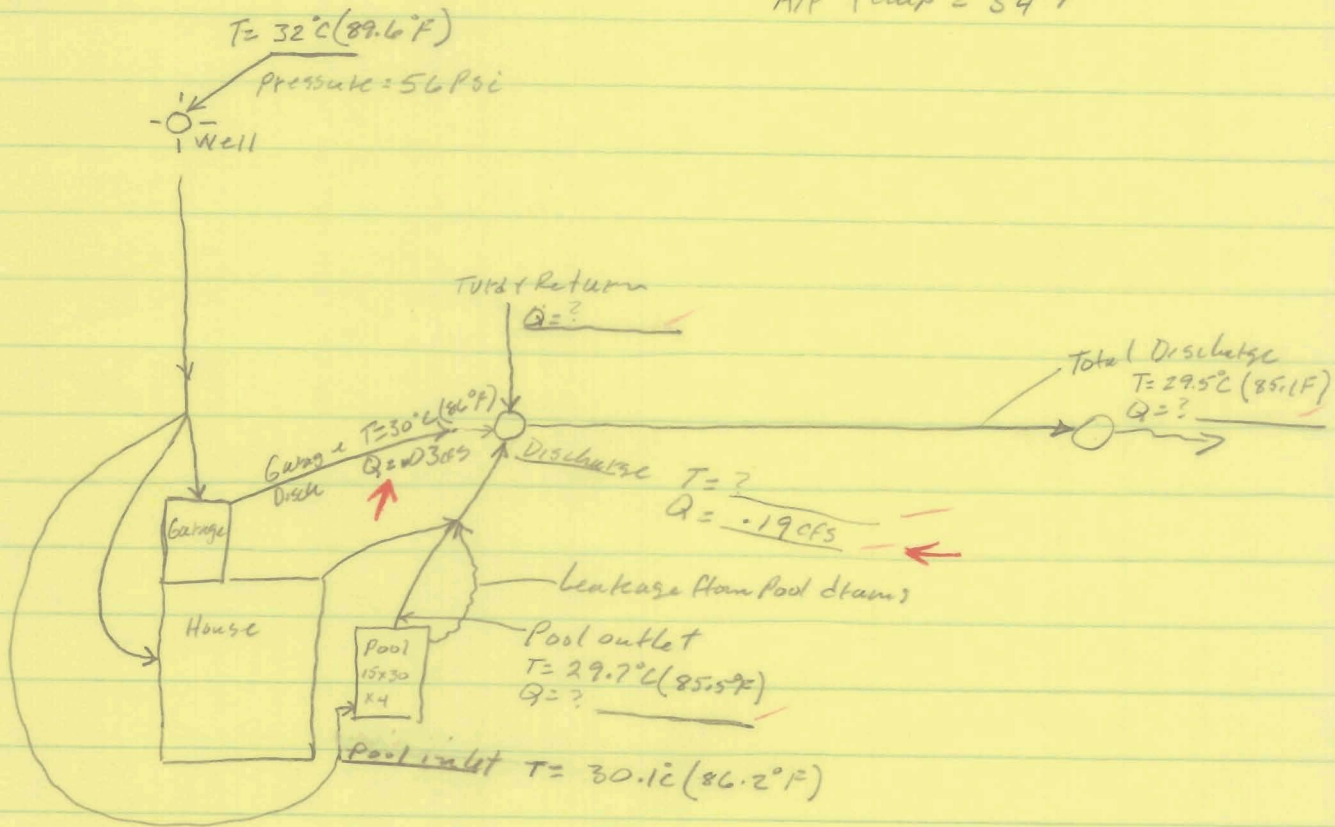
$$\text{Volume for garage} = \frac{46(625)(6146)(24)(.6)}{(73)(.90)(2.72 \times 10^6)(3.6)} = 3.96 \text{ ac-ft for garage}$$

$$\text{Total Volume} = 13.92 \text{ ac-ft}$$

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Kentlin 12/28/92

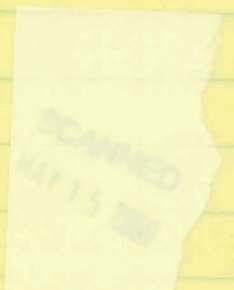
Air temp = 34°F



.22 cfs

$$\begin{array}{r} .03 \\ + .19 \\ \hline .22 \text{ cfs} \end{array}$$

177915 BTU/hr



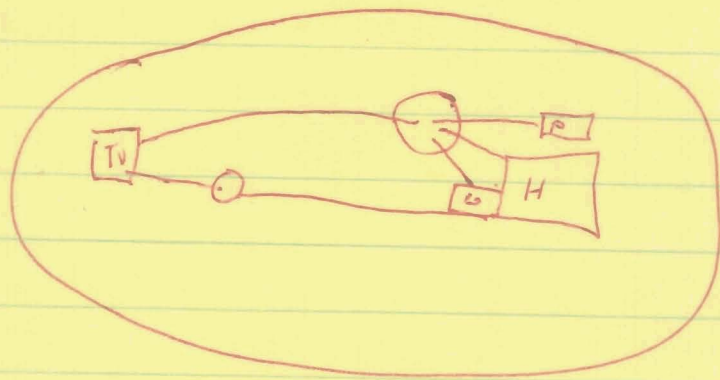
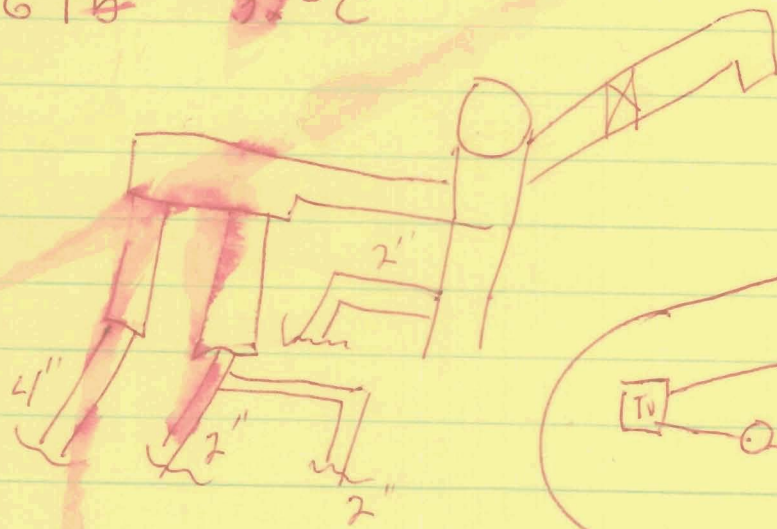
1" DIA - PVC

House Temp 68° low - 75° High

water was filed for 20" of

7° C 1:20 PM

56 lb 33° C



1 1/4" PVC

1:30 PM

30° C

1.6
2.

.137 c.f./9.5 sec.



15' x 30' 30° C + al in let of pool
out let -
34° F

Flow Calculated
at 0.19 c.f.s

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MAY 15 2011