

Geothermal Technology



HEAT PUMPS

- >AIR TO AIR HEAT PUMP.
- >AIR TO WATER HEAT PUMP. (Geothermal)
- >WATER TO WATER HEAT PUMP. (Geothermal)
- >WATER TO FREON HEAT PUMP. (Geothermal)



Air to Air heat pump

- 1) TRADITIONAL HEAT PUMP.
- 2) MONO SPLIT SYSTEMS.
- 3) MULTI SPLIT SYSTEMS.

EFFICIENCY

- 1) Traditional heat pump.
 - a) Range from 65°F to 32°F
- 2) Mono split and multi split systems.
 - a) Range from 65°F to 0°F
 - b) Efficiency when outside temperature is 5°F is 320%.

Some of them with build in VRV technology.

APPLICATION.

Every SFH with mechanical system.



Air to Water Heat Pump – “Geo exchange” (geothermal)

PERFECT TEMPERATURE.

$$0^{\circ}\text{K} = -273.15^{\circ}\text{C} = -460^{\circ}\text{F}$$

R22 vs. 410 A

Heat capacity of the agent (Freon)

R22 1.2 BTU/Lb, F

410 A 1.8 BTU/Lb, F

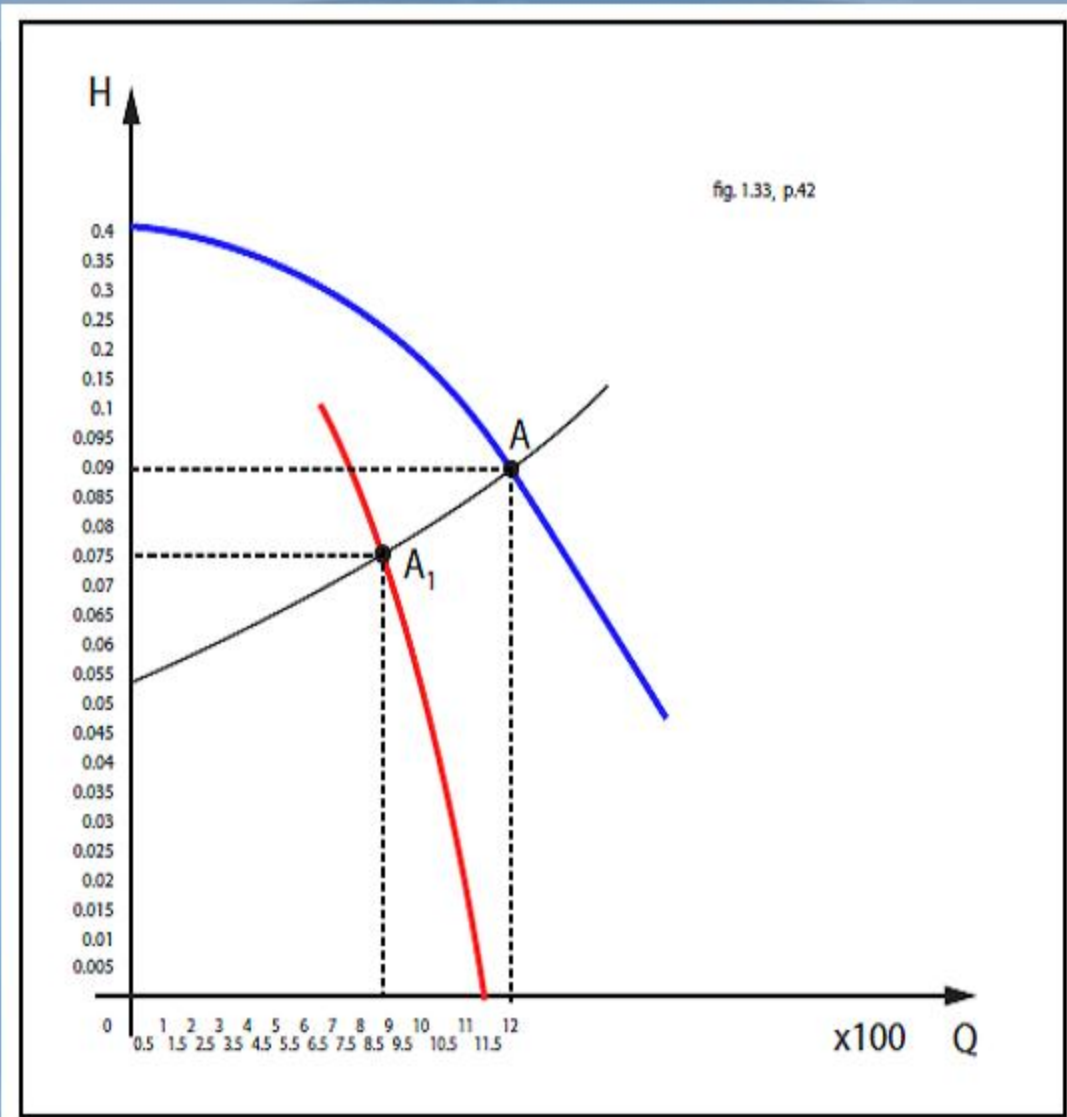
THEORETICAL SAVINGS VS. ACTUAL.

Theoretical 40% to 75%.

Actual. !!!



PV or HQ diagrams. Fan curve.





Performance

RESTRICTIONS.

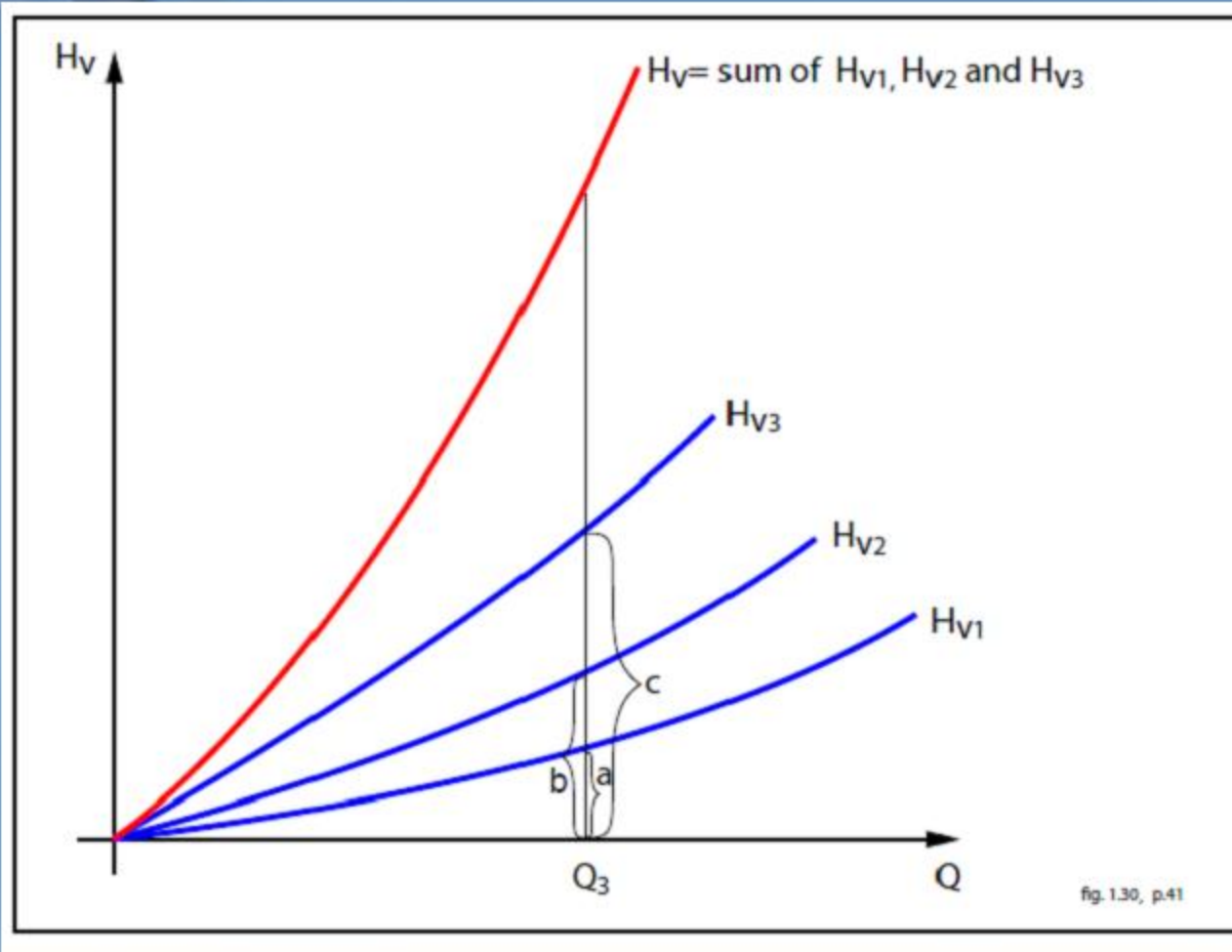
- Local.
- Linear.

Air flow.

- Laminar.
- Turbulent.

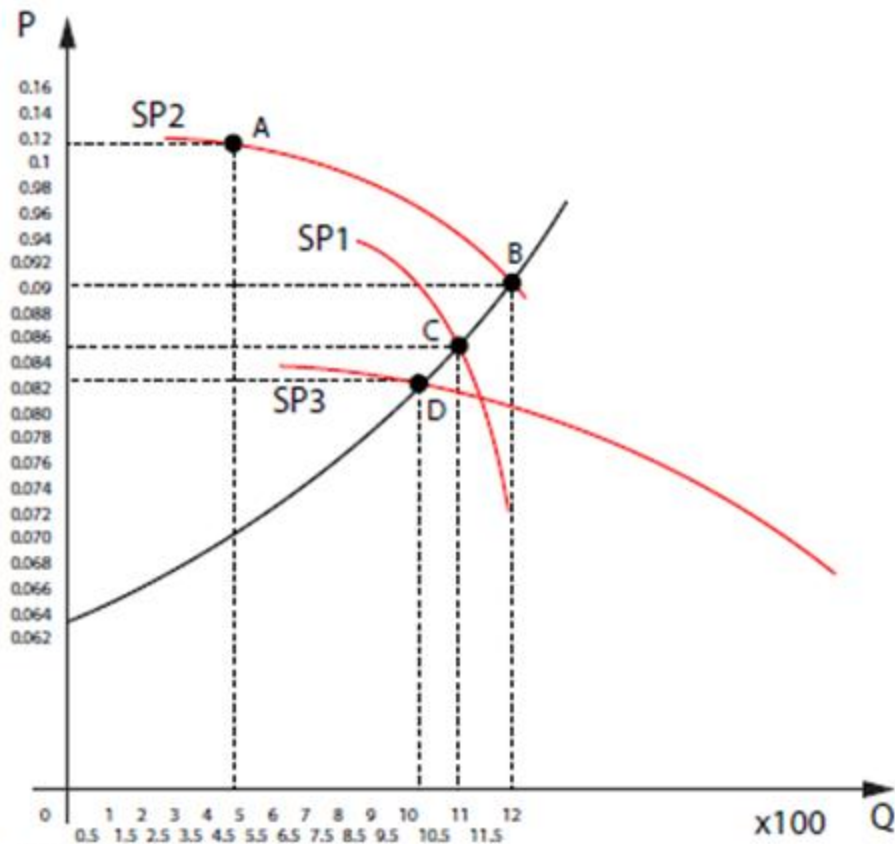
HWG (Hot Water Generator) Use the free water during the summer time.

Duct distributing system curve.





Working Point.



Работна характеристика на цент. вент. при геос



Water to Water heat pump. (Geothermal)

HYDRONICS. RADIANT HEAT.

Is there any Efficiency?

Lower DT between the source and the load Higher COP
Higher DT between the source and the load Lower COP.

- Geothermal for snowmelt. **NOT ECONOMICAL.**
- Radiant heat in concrete vs. under wood floor.
- Plate heat exchangers and other types.



Heat pump Water to Freon (geothermal)

VRV – (Variable Refrigerant Volume)

Brushless DC Magnetic Frequently drive compressors.

14% to 100% working range.

Multiple Zoning.

Much advance build in technology.

Each room has own control or central control controlling each individual room.

Up to 130% oversize of the fan coils.

Up to 40% possible savings over traditional Geothermal water to air heat pump.



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Any Questions?