ACTUAL PROBLEMS OF DEVELOPING THE UTILIZATION OF LOW-TEMPERATURE, HIGH-ENTHALPY GEOTHERMAL ENERGY

Dr. KONTRA, J. First Assistant of Technical University,
BUDAPEST XI. Müegyetem rkp.3.

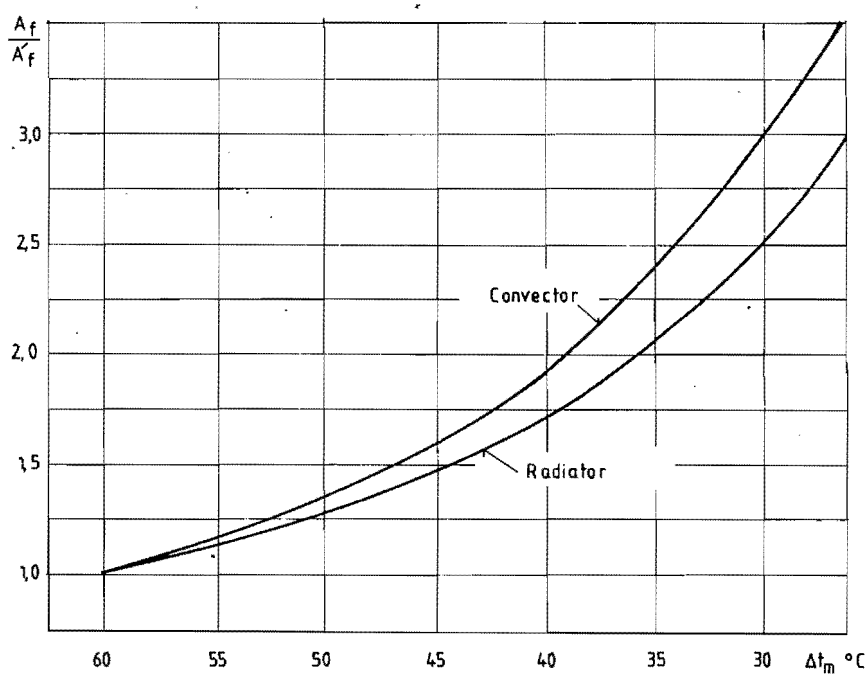
In much of the territory of Hungary, geothermal energy is won from Upper Pannonian sandstone layers, transferred by thermal water energing at a temperature below 100 °C.

Decrease of the water resources and of the bed pressure induces users to utilize thermal waters at lower temperature levels. Geothermicians have developed peculiar well design methods: partially heat insulated, or double-function wells are yielding thermal water at an improved economy in several Hungarian cities such as Szentes, Makó, Mosonmagyaróvár.

Recent water treatment methods, chemical procedures relying on chemical physical components of thermal waters, are underlying direct and indirect heat and water utilization systems, mainly for home heating. Rather than direct systems, recently indirect, heat-exchanger heating systems are designed. Separating heat and mass flow of geothermal energy, up-to-date, automatically controlled utilization implements have come about. The recently designed complex geothermal thermal-and-mineral water systems in Mosonmagyaróvár can be operated at a temperature level below the nominal 90/70 °C usual in heating buildings, without acessory heat production or other energy carriers. The system in essentially that of a so-called low temperature heating: radiant floor heating + convection heating with increased-surface radiators.

Proficiency and ecenomy of low-temperature heating - improved utilization of geotehermal energy- have been demonstrated. Surface temperature of this thermal water is 74 °C, utilized in the first stage to 50 °C, with the intermediary of a heat exchanger. The secondary cycle, that of the building heating system, has been designed for 70/45 °C.

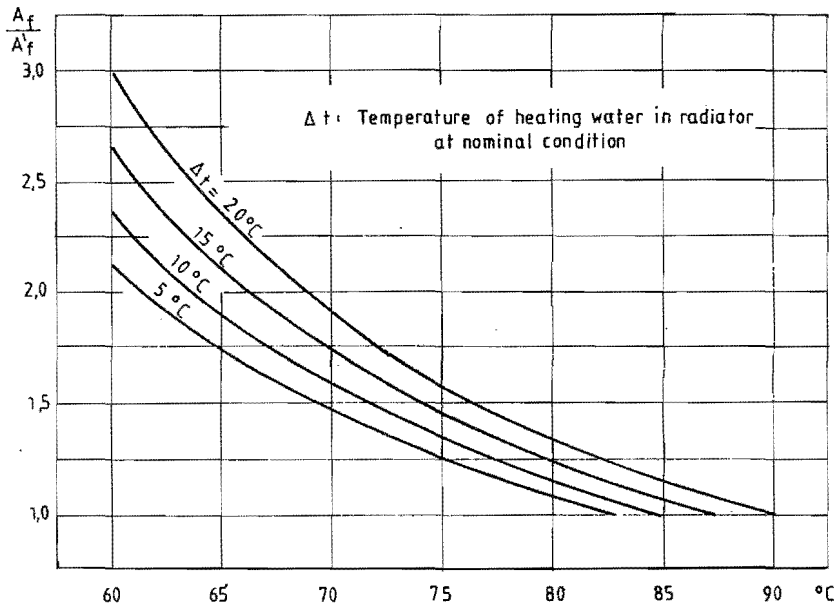
This involves a convection heating surface 1.87 times the usual one, practically the best realized with panel radiators.



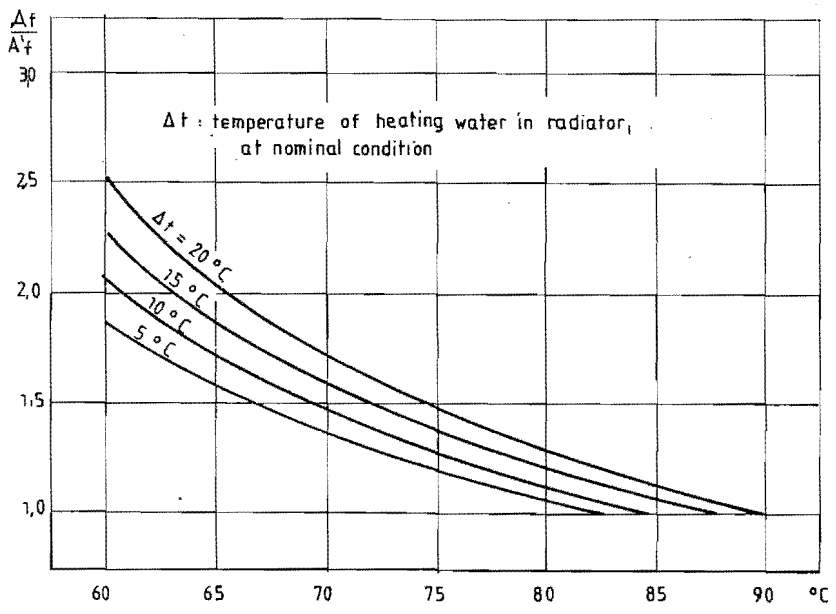
A'_f = Nominal surface of radiator

A_f = Radiator with low temperature surface

Δt_m = Average value of temperature's different



Temperature of stating heating water at nominal condition



Temperature of stating heating water at nominal condition

The return heat carrier at a nominal 45 °C from the convection heating can be applied for floor heating in wet rooms. Theoretically, also wall panel heating incorporated in outer walls has been concerned with /cascade connection/.

It has an environmental importance not to let thermal waters remain overground after cooling but to be fed back to the aquifer layer - these new exploiting-return systems are operated from a single thermal well with concentrically interposed casings. The upper section of the thermal wall is heat insulated.

In this country, important problems arise from the lack of a solution for exploiting high-enthalpy geothermal energy made to emerge in recent years.

Utilization of this steam - of a salinity and a pressure differing from those usual inthis country, and also at a higher temperature - is actually subject to theoretical considerations. Exploitation of high pressure seems to be more expedient than that of heat content. Maincharacteristics of the fluid are /Fábiansebestyén autbreak/:

-casinghead temperature:	160 °C
-casinghead pressure:	36o to 385 bars
-estimated yield:	3,5 to 5,5 cu. m/min
-salinity:	2o to 25 g/l of NaCl.

These are only informative data, the development is still in the stage of investigations and research. At a farther perspective, power production by establishing local, minor geothermal power stations is the goal.