# Case study

**BAELZ PRODUCT:** **Jet pump technology**
**INDUSTRY:** **Hospitals**
**COMPANY:** **Mainkofen hospital**
**COUNTRY:** **Germany**



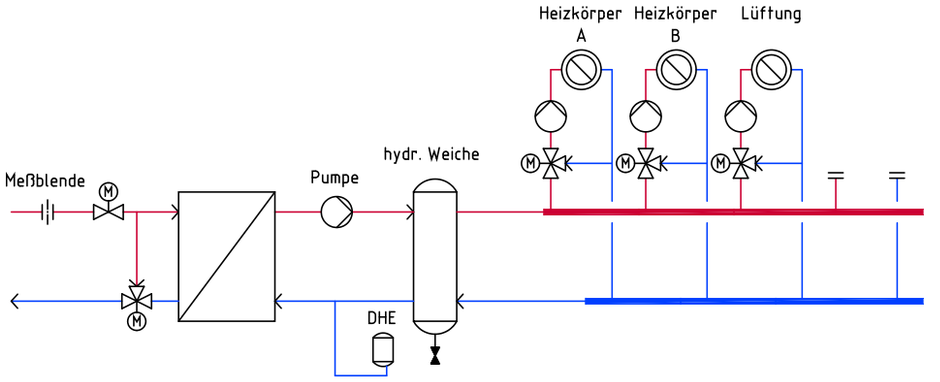
**Energy savings through the use of jet pump technology in hospitals**

In a hospital with numerous buildings, a lot of energy can be consumed for heating and electrics across long distances. Jet pump technology (e.g. Mainkofen) achieves enormous saving potential here.

**INITIAL SITUATION**

In the old boiler house, the heating water was centrally heated to 160°C and transported to the individual buildings via large walk-on supply ducts in the approx. 5 km long local heating pipeline network through the use of circulator pumps. In order to supply the required hot water on site, many additional circulator pumps were used, which led to an unacceptable accumulation of such pumps. In addition to the high heat loss along the way, energy is consumed by the numerous circulator pumps and other additionally necessary electrical equipment. The enormous maintenance expenditure was also a drain financially and due to corresponding outages.

*Diagram of an old substation with circulator pumps:*




**TECHNICAL MODIFICATIONS**

In the new heating and power station, a completely new and changed economic heating system has been developed. The formerly centralized hot water supply was decentralized and takes place in every building using jet pump technology. The connection of heat consumers in the individual buildings takes place directly with controlled jet pumps and direct hydraulic integration into the entire heating system. Reduction of heat losses, significant material savings and significantly lower maintenance costs. Significantly lower flow temperatures (80 - 90°C) and lower return temperatures (50 - 55°C) are further significant advantages.

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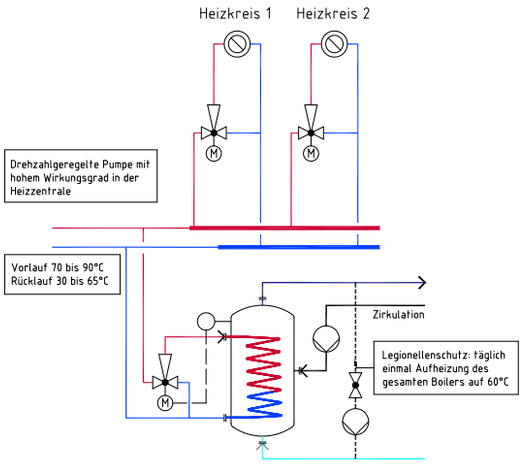
*Simplified representation of a new substation:*

CS_jet pump_0001_en_RKB_1709




The technical operations manager at Mainkofen district hospital later wrote:

*"Since 2004, only radiotherapy pumps have been used for the heat supply in our clinic. During this time, these have proved their worth over and over again due to the low maintenance effort, failure safety and last but not least the energy saving. As a result, this technology is also regarded as the basis for the planning of the new buildings that are now to be built."*

**SAVINGS/ECONOMIC EFFICIENCY**

The new heating center and the direct connection of the heat consumers via jet pumps already achieve enormous energy savings. Low maintenance and long-lasting jet pumps greatly reduced the frequency of maintenance. Material saving by means of jet pumps affected electrical circulator pumps with control in the control cabinet as well as their electrical wiring and data points for the higher-level building control system. In addition, various valves such as non-return valves, measuring orifices and differential pressure regulators as well as the hydraulic switch were eliminated, since the hydraulic stability has already been provided by the jet pump technology.

The described renovation led to electricity savings of approx. 90%. A value of 450 MWh was calculated for the elimination of 250 circulator pumps, resulting in an amount of €90,000 per year. This in turn corresponds to a 272 ton reduction in $CO_2$ emissions.

**General overview of the technology**

Function of the jet pump or three-way injector valve:

The potential energy (propellant pressure) is converted into kinetic energy (velocity) in the propellant nozzle. This results in a pressure reduction and thus a suction effect. Due to the pressure, the propellant quantity mixes with the suction quantity in the mixing tube and relaxes from the mixing pressure in the diffuser. The quantity generated is the sum of the propellant and suction quantity.

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