

# CHOOSE THE RIGHT BREWHOUSE HEATING SYSTEM

■ by Günther Thömmes ■



*Craft Brewer*

Energy needs in the brewhouse differ at each stage of the brewing process. For the mashing process, the heating device should provide a quick transfer of the required energy to heat up or boil the mash, supported by an agitator (preferably speed-controlled) for fast homogenization. For wort processing the requirements are different. The coagulation and separation of proteins, a good hop utilization, and final fixation of the wort gravity are the main tasks. To achieve these goals in the most efficient way, modern technology offers various systems and alternatives.

## Direct Fire — Cheap and Easy

The cheapest, easiest, and most traditional way has always been vessel heating by direct-fire burning. This used to be the way for all types and sizes of brewhouses, but today it is only used for brewing in brewpubs and microbreweries. The furnace is usually made of mild steel (St 37), either primed or galvanized. There are also good furnaces made with stainless steel.

The available burning media

are gas and light fuel. Fuel offers better utilization, but gas has the advantage of not requiring a storage tank.

Efficiency in terms of dimethyl sulfide (DMS) volatilization and coagulation of protein is good with direct fire.

Compared with other established systems, direct burning works with less efficiency. The average utilization is around 60 percent. Based on this average, the specific energy consumption lies somewhere between 105 and 125 megajoules (MJ) per barrel.

Another drawback is that the heating surface is limited to the bottom of the vessel; no internal boilers or coils are possible. Especially for the wort processing, this is a disadvantage resulting in worse convection ("rollover"), lower evaporation, and a less homogeneous composition of the wort.

The higher temperatures at the bottom surface with direct fire require faster mixing and also higher shear forces to avoid burning and caramelizing the mash/wort. Older brewhouses are sometimes equipped with a chain hooked on the agitator just to

## ENERGY GUIDELINE

**Energy efficiency for wort-boiling vessels only; efficiency of steam or hot-water generation is not included.**

Direct-fire heating with coal:

**about 45 percent**

Direct-fire heating with gas:

**50 to 55 percent**

Direct-fire heating with light fuel:

**55 to 75 percent**

Saturated steam:

**minimum of 90 percent**

Hot pressurized water:

**minimum of 90 percent**