

ENERGY EFFICIENCY OF WATER HEATERS

The federal efficiency standards for water heaters took effect in 1990, assuring consumers that all new water heaters meet certain minimum-efficiency levels. New standards, which took effect in January 2004, will increase the minimum efficiency levels of these products.

Water heater efficiency is reported in terms of the **energy factor (EF)**. EF is an efficiency ratio of the energy supplied in heated water divided by the energy input to the water heater, and it is based on recovery efficiency, standby losses, and cycling losses. The higher the EF, the more efficient the water heater.

- Electric resistance water heaters have EFs ranging from 0.7 and 0.95.
- Gas water heaters from 0.5 and 0.6, with some high-efficiency models ranging around 0.8.
- Oil water heaters from 0.7 and 0.85.
- Heat-pump water heaters from 1.5 to 2.0.

There is little difference between the most efficient electric resistance storage water heaters and the minimum-efficiency standard that will take effect in January 2004.

If you need to rely on electricity to heat your water, keep your eye out for the further development of heat-pump water heaters. This technology uses one-third to one-half as much electricity as a conventional electric resistance water heater.

Energy Efficiency Recommendations

Everything else being equal, select a water heater with the highest energy factor (EF). Below is a table with energy efficiency recommendations.

Water Heater Energy Efficiency Recommendations				
Storage Type	Recommended		Best Available	
	Energy Factor	Annual Energy Use (kWh)	Energy Factor	Annual Energy Use (kWh)
Less than 60 gallons	0.93	4,721	0.95	4,622
60 gallons or more	0.91	4,825	0.92	4,773

Other Considerations

In addition to EF, also look for a water heater with at least one-and-a-half inches of tank insulation and a heat trap.

In addition, capacity of a water heater is an important consideration. The water heater should provide enough hot water at the busiest time of the day.

For example, a household of two adults may never use more than 30 gallons of hot water in an hour, but a family of six may use as much as 70 gallons in an hour.

The ability of a water heater to meet peak demands for hot water is indicated by its "first hour rating." This rating accounts for the effects of tank size and the speed by which cold water is heated. Water heaters must be sized properly. Over-sized water heaters not only cost more but increase energy use due to excessive cycling and higher standby losses.

Source: <https://www.e-education.psu.edu/egee102/node/2009>