Calculation and Selection of a DHW (Domestic Hot Water) Heater Tank

Initial data

500 [liters]	A water reserve is necessary	**10 => 45 [°C]**	Temperature of heated water at the inlet and outlet of the tank
30 [kW]	Thermal power of the heat source	**80 => 60 [°C]**	Heating water temperature at the inlet and outlet of the tank

Calculation results

500 [liters] / 0.9 = 556 [liters]	The volume of the tank is increased relative to the given storage of hot water, since the water in the lower part of the tank under the heat exchanger is always underheated
[(60-10) -(80-45)] / log[(60-10) / (80-45)] = 42.1 [°C]	Logarithmic temperature difference for the specified temperature mode of operation of the heat exchanger
660 [W/m2*°C]	Coefficient of heat transfer of the heat exchanger
3.70 [m2]	Surface area of the heat exchanger
660 [kW/m2*°C] *3.70 [m2] *42.1 [°C] = 102 808 [W]	Thermal capacity of the heat exchanger built into the tank at the specified temperature mode

The thermal power of the heat source 30 000 [W] is less than the heating power of the heat exchanger 102 808 [W].
Due to the deficit of heat generation for further calculation of the long-term heating power and time for heating, we use the thermal power of the heat source 30 000 [W]

1003 -0.156 *45 -0.0029 *45^2 = 990 [kg/m3]	Water density in the tank t=45°C
(3.6 *30 000 000)/(4.187 *(45 -10) *990) = 744.419 [m3/h]	Long-term heating capacity
(750 [liters] *60)/(744.419 [m3/h] *1000 *0.85) = 0 [minute]	The time of heating the entire volume of the tank

Selection result

Hot water heater (DHW)

Reflex : AF 750

Germany

750 [liters]	Volume of the tank
PN 10 [bar]	Nominal pressure for the tank
Tmax 95°C	Maximum temperature for tank
273 [kg]	The mass of the tank
D 950 / H 2014 [mm]	Diameter / height of the tank
steel	Tank body material
100 [mm]	Thickness of tank insulation
99 [W]	Heat losses from the surface of the tank at a temperature difference of water and ambient air dt=40°C
one smooth tube	Heat exchanger S1 = 3.70 [m2] | PN 16 bar