LPG Vaporiser Duty and Heater Power

Heat needed to vaporise and superheat liquid LPG for a burner, and the vaporiser heater power, from the LPG flow, temperatures and the supplier's property data.

Method: First law of thermodynamics (sensible plus latent heat)

Input parameters

Unit system: SI

Parameter	Value	Unit
LPG flow	200.00	kg/h
Liquid LPG temperature in	10.000	°C
Vaporising temperature (at vaporiser pressure) The boiling temperature of your LPG mix at the vaporiser pressure, from the supplier; enter the latent heat at this temperature.	30.000	°C
Vapour temperature out	40.000	°C
Specific heat of the liquid	2.5000	kJ/(kg·K)
Latent heat at the vaporising temperature	380.00	kJ/kg
Specific heat of the vapour	1.7000	kJ/(kg·K)
Vaporiser heater efficiency	90.000	%

Calculated results

Parameter	Value	Unit
Vaporiser duty	24.833	kW
Heater power (electric or water bath)	27.593	kW
Of which latent heat	21.111	kW

Formula and method

$$\dot{Q} = \dot{m}\left[c_{p,l}\left(T_v - T_1\right) + h_{fg} + c_{p,v}\left(T_2 - T_v\right)\right] \qquad P = \frac{\dot{Q}}{\eta} \qquad \dot{Q}_l = \dot{m}\, h_{fg}$$

Variables

$\dot{m}$	LPG flow	kg/s
T_1	liquid temperature in	K
T_v	vaporising temperature	K
T_2	vapour temperature out	K
$c_{p,l}$	liquid specific heat	J/(kg·K)
h_{fg}	latent heat	J/kg
$c_{p,v}$	vapour specific heat	J/(kg·K)
η	heater efficiency	–
$\dot{Q}$	vaporiser duty	W
P	heater power	W
$\dot{Q}_l$	latent heat part	W

Method and standards

Energy balance of the LPG through the vaporiser; properties are entered from the supplier's data.

Assumptions and limits

- Constant properties; single vaporising temperature (a propane–butane mix boils over a small temperature glide).

- The vaporising temperature and latent heat must belong to the same vaporiser pressure; the defaults are illustrative, not supplier data.
- Liquid entering above the vaporising temperature flashes; a warning is shown.

References

- First law of thermodynamics (sensible plus latent heat)

Report details

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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/boilers-power-plant/combustion/lpg-vaporiser

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Reopens the calculator with the inputs of this report.