TEG Regenerator Reboiler Duty

Reboiler duty of a triethylene glycol regenerator from glycol circulation, heating to reboiler temperature, water boiled off, still reflux and heat losses.

Method: Glycol regenerator heat balance

Input parameters

Unit system: SI

Parameter	Value	Unit
Glycol circulation	1.5000	m³/h
Rich glycol density	1,110.0	kg/m³
Glycol specific heat	2.5000	kJ/(kg·K)
Rich glycol temperature to the reboiler	150.00	°C
Reboiler temperature	204.00	°C
Water removed	50.000	kg/h
Heat to vaporise water (incl. desorption)	2,480.0	kJ/kg
Reflux ratio (water refluxed per water removed)	0.25000	
Heat losses	10.000	%

Calculated results

Parameter	Value	Unit
Sensible heat	62.438	kW
Water vaporisation	34.444	kW
Reflux duty	8.6111	kW
Reboiler duty	117.21	kW
Duty per litre of glycol circulated (kJ/L)	281.31	

Notes for this case

• Duty = [sensible + vaporisation + reflux]/(1 − losses). The reboiler normally runs near 200–204 °C (above that TEG degrades); a lean/rich exchanger heating the rich glycol is the main lever on duty. Rules of thumb are about 2,000 Btu per US gallon of TEG circulated; check against this result.

Formula and method

$$\dot{Q} = \frac{\dot{V}_g \rho c_p (T_r - T_{in}) + \dot{m}_w h_{fg} (1 + r)}{1 - f_L}$$

Variables

$\dot{V}_g$	Glycol circulation	m³/s
ρ_g	Rich glycol density	kg/m³
$c_{p,g}$	Glycol specific heat	J/(kg·K)
T_{in}	Rich glycol temperature to the reboiler	K
T_r	Reboiler temperature	K
$\dot{m}_w$	Water removed	kg/s
h_{fg}	Heat to vaporise water (incl. desorption)	J/kg
r	Reflux ratio (water refluxed per water removed)	-
f_L	Heat losses	-

$\dot{Q}_s$	Sensible heat	W
$\dot{Q}_v$	Water vaporisation	W
$\dot{Q}_r$	Reflux duty	W
$\dot{Q}$	Reboiler duty	W
$\dot{Q}/\dot{V}_g$	Duty per litre of glycol circulated (kJ/L)	-

Method and standards

Reboiler duty.

Assumptions and limits

- Steady state; constant properties.

References

Glycol regenerator heat balance

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/chemical/oil-gas/glycol-reboiler-duty

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.