

Example

Find net gear shaft power output, net generator power, fuel consumption, exhaust mass flow and recoverable exhaust heat at 25°C , base rating. Assume 50 mm H₂O intake loss, 75 mm H₂O exhaust loss, a generator efficiency of 95% and site location 500 meters above sea level.

From Figure 1:	Gear shaft power output at 25°C, Fuel Consumption,	P = 1430 kW Qf = 8.97 MJ/s
From Figure 2:	Exhaust mass flow rate,	Mex = 12.3 kg/s
From Figure 3:	Recoverable exhaust heat,	Qex = 5650 kW
From Figure 4:	Correction for inlet loss of 50mm H ₂ O,	DPin = 18 kW
From Figure 5:	Correction for exhaust loss of 75 mm H ₂ O,	DPex = 15 kW
From Figure 6:	Correction for site altitude of 500 m,	δ = 0.938
1) Net gear shaft power output =	1430 x 0.938 - 18 - 15 =	1310 kW
2) Net generator power =	1310 x 0.95 =	1240 kWe
3) Fuel consumption =	8.97 x 0.938 =	8.41 MJ/s
4) Exhaust mass flow =	12.3 x 0.938 =	11.5 kg/s
5) Recoverable exhaust heat =	5650 x 0.938 =	5300 kW

If the stack temperature, T_{stack} = 170°C:

$$\begin{aligned} \text{Recoverable exhaust heat} &= [5650 + (160 - 170) \times 1.048^{**} \times 12.3] \times 0.938 \\ &= 5180 \text{ kW} \end{aligned}$$

** Cp - mean for the range of 160°C to 170°C stack temperature

Conversion factors:

1 kg =	2.205 lbs
1 MJ =	947.9 BTU
1 kW =	1.341 SHP
1 mm =	0.03937 in