

Gas Meter Correction Factor Calculations

Assumptions

Calorific Value	37.9MJ/m3	(CV)
Standard Temperature (sT)	288°K	(T1)
Standard Pressure (sP)	1.01325bar	(P1)

Calculations

$$\text{Gas Relationship States} \quad \frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$\text{Therefore} \quad V_1 = V_2 \left(\frac{P_2}{P_1} \times \frac{T_1}{T_2} \right)$$

$$\text{Energy Content} = V_2 \left(\frac{P_2}{T_2} \times \frac{T_1}{P_1} \right) \times 37.9$$

Therefore to calculate effects of pressure/temperature change on the meter accuracy, the above calculation is to be carried out for the recorded minimums and maximums of both pressure and temperature.

Recorded Data (Temp.)	(°C)	(°K)	Symbol
Maximum Temperature	16.1	289.1	T _{max}
Minimum Temperature	14.2	287.2	T _{min}

Recorded Data (Press.)	mbar	bar	Symbol
Maximum Pressure	1020	1.02	P _{max}
Minimum Pressure	997	0.997	P _{min}

Energy Content for 1m ³ (at sT and sP)	=	$1 \times \left(\frac{1.0133}{288} \times \frac{288}{1.0133} \right) \times 37.9$
Energy Content for 1m ³ (at sT and sP)	=	$1 \times \left(0.00352 \times 284.23 \right) \times 37.9$
Energy Content for 1m ³ (at sT and sP)	=	37.90

Energy Content for 1m ³ (at Pmax and Tmin)	=	$1 \times \left(\frac{1.020}{287.2} \times \frac{288}{1.0133} \right) \times 37.9$
Energy Content for 1m ³ (at Pmax and Tmin)	=	$1 \times \left(0.00355 \times 284.23 \right) \times 37.9$
Energy Content for 1m ³ (at Pmax and Tmin)	=	38.26

Energy Content for 1m ³ (at Pmin and Tmax)	=	$1 \times \left(\frac{0.997}{289.1} \times \frac{288}{1.0133} \right) \times 37.9$
Energy Content for 1m ³ (at Pmin and Tmax)	=	$1 \times \left(0.00345 \times 284.23 \right) \times 37.9$
Energy Content for 1m ³ (at Pmin and Tmax)	=	37.15

Therefore maximum percentage difference due to pressure and temperature variations:

Positive Percentage Variance **0.95%**

Negative Percentage Variance **-1.98%**