Calculation of Chimney Height Using Method in Technical Guidance Note D1

Kriger 2 MWth Biomass Boiler, Hale Construction Ltd, Neath
Calculations Based on Data Supplied by Kriger and Woodtek Energy Ltd (Darren Jones)
April 17, 2019

PG 5/1(18) ELVs converted to 11% O2 equivalents

Gas Temp C	130
Gas Temp K	403
Stack Diameter	0.50
Gas Rate Am3/s	1.26
Gas Velocity m/s	6.4
FG O2 (%)	NA
Building Height m	6.0
FG H2O (%)	NA
Std O2 (%)	NA

XS Area 0.20 m²
0.85 Nm3/s @ 11% O2
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3,043 Nm3/hr @ 11% O2
4,536 Am3/hr
1.26 Am3/s
1.26 Am3/s

Heat Release MWth (1 Boiler)	Heat Release MWth (>1 Boiler)
0.129	

No. of Boilers 1
Diameter of 1 Flue (m) 0.5
I Boiler
I Boiler
Multiple Boilers

Q<1	a	-0.94
	b	0.49
Q>1	a	-1.01
	b	0.48
	x	-2.92
	y	5.43
	z	-2.27

	Discharge Conc. (mg/m3)		Discharge Conc. (mg/Nm3)	Discharge Rate (g/s)	Guideline Concentration (mg/m3)	Background Concentration (mg/m3)	Pollution Index (m3/s)	
NOx			332	0.281	4.40	0.020	64	NOx
NO2			166	0.140	0.2	0.015	759	NO2
NO			166	0.140	1	0.005	141	NO
CO			149	0.126	57	0.110	2	CO
PM_{10}	10		7	0.006	0.05	0.014	157	PM10
Total							759	Total

Case for Single Building

Ub (m)	M (m4/s2)		Min Um (m)	Um (m)	U Corrected Chimney Height (Metres)	Height Above Building (Metres)
2.9	5.7		1.4	5.4	9.7	3.7

Case for Multiple Buildings within 5Um

5Um = 27.0 metres CHECK THAT D<5Um

Building No.	Distance (metres)		Ridge Height (metres)	Height (H)	Projected Width (B)	Length (metres)	K (Min H & B)	T (H+1.5K)
Boiler House	0	1	6.0	6.0	46.6	43.8	6.0	15.0
1	24	1	12.0	12.0	81.8	73.3	12.0	30.0
2	44	0	15.0	0.0	64.5	55.4	0.0	0.0

Length	Width
43.8	15.9
73.3	36.3
55.4	33.1

Hm (Hmax)	Tm (Tmax)		U Min Um&Ub	Is U>Tm? (1=Y, 0=N)	Corr. Disch. Ht. (Metres)
12.0	30.0		2.9	0	16

Effective Chimney Height (U_{eff})

$U_{eff} = 1.66 \times (U_{act} - H)$

U_{eff}	U_{act}
-3.3	10.0
-1.7	11.0
0.0	12.0
1.7	13.0
3.3	14.0
5.0	15.0
6.6	16.0
8.3	17.0
10.0	18.0
11.6	19.0
13.3	20.0