

Appendix 3K Derivation of Cumulative Annual Average NO_x to NO₂ Conversion Equation using Jenkin's Method

Annual Average NO_x and NO₂ concentrations in Recent 5 Years (Year 2019 - 2023) at Selected EPD AQMS

Air Quality Monitoring Station	Year	Measured NO _x (ug/m ³)	Measured NO ₂ (ug/m ³)	Conversion [1]
Tuen Mun	2019	69	47	50
	2020	55	40	42
	2021	59	44	44
	2022	53	39	40
	2023	53	40	40
Tap Mun	2019	12	10	10
	2020	11	9	9
	2021	12	10	10
	2022	13	8	11
	2023	14	8	12
Mong Kok	2019	154	78	78
	2020	162	74	79
	2021	139	70	75
	2022	131	64	74
	2023	131	68	74

Note:

[1] The conversion is computed from SAMP v2.0, with OX = 95.57 and j/k = 17.114.

The functional form curve is presented as below:

$$[NO_2] = \frac{\left([NO_x] + [OX] + \frac{J}{k}\right) - \sqrt{\left([NO_x] + [OX] + \frac{J}{k}\right)^2 - 4[NO_x][OX]}}{2}$$

where

- [NO₂] = the total predicted NO₂ concentration
- [NO_x] = the predicted NO_x concentration
- [OX] = the sum of NO₂ concentration and O₃ concentration
- J = the photolysis rate of NO₂
- k = the rate coefficient for reaction between NO and O₃

