

Sample Calculation of Portal Emission (RSP) at Hour 08

Tunnel	Source	Direction	Tunnel Length	Tunnel Length	Traffic Flow	Composite Emission Factor	Total Emission	Total Emission	Total Portal Emission	
			(m)	(mile)					(veh/hr)	(g/mile-veh)
									(g/s)	(g/s)
Tseung Kwan O Tunnel	Tseung Kwan O Tunnel (WB) Tunnel Portal at Kwun Tong Side	Tseung Kwan O Tunnel (WB)	857	0.5324	2636	0.0653	91.6757	0.0255	1.70E-02	8.49E-03
	Tseung Kwan O Tunnel (EB) Tunnel Portal at Tseung Kwan O side	Tseung Kwan O Tunnel (EB)	871	0.5410	3112	0.0653	109.9808	0.0306	2.04E-02	1.02E-02

Note:

[1] The composite emission factors are calculated from the traffic flow provided by traffic engineer and the emission factors extracted from EmFAC-HK v2.6

[2] The emission showed in the table is a sample calculation at Hour 08 only. Emission of each hours are derived from corresponding traffic flow and emission factors at each hours.

[3] No ventilation building is served for the tunnel. All emission within the tunnel is exited at the tunnel portals.

Sample Calculation of Portal Emission (FSP) at Hour 08

Tunnel	Source	Direction	Tunnel Length	Tunnel Length	Traffic Flow	Composite Emission Factor	Total Emission	Total Emission	Total Portal Emission	
			(m)	(mile)					(veh/hr)	(g/mile-veh)
									(g/s)	(g/s)
Tseung Kwan O Tunnel	Tseung Kwan O Tunnel (WB) Tunnel Portal at Kwun Tong Side	Tseung Kwan O Tunnel (WB)	857	0.5324	2636	0.0600	84.2149	0.0234	1.56E-02	7.80E-03
	Tseung Kwan O Tunnel (EB) Tunnel Portal at Tseung Kwan O side	Tseung Kwan O Tunnel (EB)	871	0.5410	3112	0.0600	101.0295	0.0281	1.87E-02	9.35E-03

Note:

[1] The composite emission factors are calculated from the traffic flow provided by traffic engineer and the emission factors extracted from EmFAC-HK v2.6

[2] The emission showed in the table is a sample calculation at Hour 08 only. Emission of each hours are derived from corresponding traffic flow and emission factors at each hours.

[3] No ventilation building is served for the tunnel. All emission within the tunnel is exited at the tunnel portals.

RSP Hourly Traffic Flow and Emission Factors at Year 2017

Tunnel	Source	Direction	Tunnel Length (m)	Tunnel Length (mile)	Traffic Flow and Emission Factor																																															
					Hr 01		Hr 02		Hr 03		Hr 04		Hr 05		Hr 06		Hr 07		Hr 08		Hr 09		Hr 10		Hr 11		Hr 12		Hr 13		Hr 14		Hr 15		Hr 16		Hr 17		Hr 18		Hr 19		Hr 20		Hr 21		Hr 22		Hr 23			
					Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)	Flow (veh/hr)	Emf (g/veh)		
Tseung Kwan O Tunnel	Tseung Kwan O Tunnel (WB) Tunnel Portal at Kwan Tong Side	Tseung Kwan O Tunnel (WB)	807	0.5324	803	0.5473	890	0.5469	483	0.5469	396	0.5451	308	0.5450	890	0.5470	1191	0.5488	2207	0.5544	2596	0.5553	2391	0.5564	2211	0.5553	2093	0.5550	2093	0.5545	2012	0.5544	2231	0.5544	2324	0.5544	2473	0.5561	2917	0.5582	2477	0.5578	2127	0.5588	1936	0.5562	1007	0.5543	1435	0.5517	1185	0.5484
	Tseung Kwan O Tunnel (EB) Tunnel Portal at Tseung Kwan O side	Tseung Kwan O Tunnel (EB)	871	0.5410	948	0.5466	685	0.5471	535	0.5463	422	0.5483	422	0.5463	685	0.5472	1300	0.5488	2605	0.5543	3112	0.5553	2826	0.5563	2810	0.5553	2460	0.5570	2436	0.5543	2375	0.5544	2833	0.5545	2755	0.5545	2620	0.5564	2971	0.5582	2524	0.5582	2511	0.5580	1934	0.5564	1779	0.5542	1694	0.5517	1399	0.5486

RSP Hourly Emission at Year 2017

Tunnel	Source	Direction	Tunnel Length (m)	Tunnel Length (mile)	Hourly RSP Emission (g/hr)																																																	
					Hr 01		Hr 02		Hr 03		Hr 04		Hr 05		Hr 06		Hr 07		Hr 08		Hr 09		Hr 10		Hr 11		Hr 12		Hr 13		Hr 14		Hr 15		Hr 16		Hr 17		Hr 18		Hr 19		Hr 20		Hr 21		Hr 22		Hr 23					
					Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)			
Tseung Kwan O Tunnel	Tseung Kwan O Tunnel (WB) Tunnel Portal at Kwan Tong Side	Tseung Kwan O Tunnel (WB)	807	0.5324	2.02E+01	2.02E+01	1.45E+01	1.45E+01	1.10E+01	1.10E+01	8.59E+00	8.59E+00	8.59E+00	8.59E+00	1.45E+01	1.45E+01	2.86E+01	2.86E+01	6.36E+01	6.36E+01	9.17E+01	9.17E+01	7.18E+01	7.18E+01	7.05E+01	7.05E+01	6.43E+01	6.43E+01	5.98E+01	5.98E+01	5.83E+01	5.83E+01	6.45E+01	6.45E+01	6.76E+01	6.76E+01	7.39E+01	7.39E+01	7.36E+01	7.36E+01	7.00E+01	7.00E+01	7.83E+01	7.83E+01	6.77E+01	6.77E+01	4.90E+01	4.90E+01	4.36E+01	4.36E+01	3.95E+01	3.95E+01	3.11E+01	3.11E+01
	Tseung Kwan O Tunnel (EB) Tunnel Portal at Tseung Kwan O side	Tseung Kwan O Tunnel (EB)	871	0.5410	2.41E+01	2.41E+01	1.74E+01	1.74E+01	1.34E+01	1.34E+01	1.06E+01	1.06E+01	1.06E+01	1.06E+01	1.74E+01	1.74E+01	3.44E+01	3.44E+01	7.66E+01	7.66E+01	1.10E+02	1.10E+02	8.60E+01	8.60E+01	9.22E+01	9.22E+01	9.22E+01	9.22E+01	7.71E+01	7.71E+01	7.18E+01	7.18E+01	7.78E+01	7.78E+01	8.12E+01	8.12E+01	8.12E+01	8.12E+01	8.30E+01	8.30E+01	8.20E+01	8.20E+01	8.16E+01	8.16E+01	5.95E+01	5.95E+01	5.22E+01	5.22E+01	4.74E+01	4.74E+01	3.76E+01	3.76E+01		

RSP Hourly Emission at Year 2017

Tunnel	Source	Tunnel Length (m)	Tunnel Length (mile)	Hourly RSP Emission Rate at Tunnel Portal (g/h)																																													
				Hr 01		Hr 02		Hr 03		Hr 04		Hr 05		Hr 06		Hr 07		Hr 08		Hr 09		Hr 10		Hr 11		Hr 12		Hr 13		Hr 14		Hr 15		Hr 16		Hr 17		Hr 18		Hr 19		Hr 20		Hr 21		Hr 22		Hr 23	
				Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)
Tseung Kwan O Tunnel	Tseung Kwan O Tunnel (WB) Tunnel Portal at Kwan Tong Side	807	0.5324	6.66E-03	6.66E-03	4.92E-03	4.92E-03	3.72E-03	3.72E-03	2.94E-03	2.94E-03	2.94E-03	2.94E-03	4.92E-03	4.92E-03	9.85E-03	9.85E-03	2.15E-02	2.15E-02	3.06E-02	3.06E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	1.76E-02	1.76E-02	1.62E-02	1.62E-02	1.76E-02	1.76E-02	1.86E-02	1.86E-02	1.96E-02	1.96E-02	2.06E-02	2.06E-02	2.06E-02	2.06E-02	1.96E-02	1.96E-02	2.15E-02	2.15E-02	1.64E-02	1.64E-02	1.45E-02	1.45E-02	1.05E-02	1.05E-02
	Tseung Kwan O Tunnel (EB) Tunnel Portal at Tseung Kwan O side	871	0.5410	6.66E-03	6.66E-03	4.92E-03	4.92E-03	3.72E-03	3.72E-03	2.94E-03	2.94E-03	2.94E-03	2.94E-03	4.92E-03	4.92E-03	9.85E-03	9.85E-03	2.15E-02	2.15E-02	3.06E-02	3.06E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	1.76E-02	1.76E-02	1.62E-02	1.62E-02	1.76E-02	1.76E-02	1.86E-02	1.86E-02	1.96E-02	1.96E-02	2.06E-02	2.06E-02	2.06E-02	2.06E-02	1.96E-02	1.96E-02	2.15E-02	2.15E-02	1.64E-02	1.64E-02	1.45E-02	1.45E-02	1.05E-02	1.05E-02

RSP Emission Inventory for Tunnel Portal Emission at 2017

Tunnel	Source	Source ID	Type	X (m)	Y (m)	Base Elevation (m)	Release Height (m)	Lateral Dim. (Sy) (m)	Vertical Dim. (Sz) (m)	Hourly RSP Emission Rate (g/s)																							
										Hr 00	Hr 01	Hr 02	Hr 03	Hr 04	Hr 05	Hr 06	Hr 07	Hr 08	Hr 09	Hr 10	Hr 11	Hr 12	Hr 13	Hr 14	Hr 15	Hr 16	Hr 17	Hr 18	Hr 19	Hr 20	Hr 21	Hr 22	Hr 23
										Tseung Kwan O Tunnel (WB) Tunnel Portal at Kwun Tong Side		TTW01	Volume	843056.2	819795.5	81.1	3.80	3.26	3.53	4.68E-04	3.35E-04	2.55E-04	1.99E-04	1.99E-04	3.36E-04	6.63E-04	1.48E-03	2.12E-03	1.66E-03	1.78E-03	1.49E-03	1.38E-03	1.35E-03

FSP Hourly Traffic Flow and Emission Factors at Year 2017

Tunnel	Source	Direction	Tunnel Length (m)	Tunnel Length (mile)	Traffic Flow and Emission Factor																																															
					Hr 01		Hr 02		Hr 03		Hr 04		Hr 05		Hr 06		Hr 07		Hr 08		Hr 09		Hr 10		Hr 11		Hr 12		Hr 13		Hr 14		Hr 15		Hr 16		Hr 17		Hr 18		Hr 19		Hr 20		Hr 21		Hr 22		Hr 23			
					Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)	Flow (veh/hr)	Emf (g/veh-mi)		
Teung Kean O Tunnel	Teung Kean O Tunnel (WB) Tunnel Portal at Kwan Tong Side	Teung Kean O Tunnel (WB)	857	0.5324	803	0.5435	890	0.5431	483	0.5419	398	0.5414	308	0.5414	890	0.5432	1191	0.5448	2207	0.5500	2596	0.5500	2393	0.5518	2211	0.5599	2093	0.5533	2093	0.5500	2012	0.5500	2230	0.5489	2324	0.5500	2473	0.5516	2917	0.5534	2477	0.5531	2127	0.5549	1936	0.5516	1007	0.5489	1435	0.5475	1185	0.5453
			871	0.5410	948	0.5431	685	0.5432	635	0.5425	422	0.5425	422	0.5425	685	0.5434	1300	0.5449	2605	0.5499	3112	0.5500	2826	0.5517	2610	0.5500	2460	0.5532	2436	0.5489	2375	0.5489	2633	0.5500	2755	0.5501	2620	0.5518	2971	0.5534	2524	0.5534	2511	0.5552	1934	0.5518	1779	0.5489	1694	0.5475	1399	0.5455

FSP Hourly Emission at Year 2017

Tunnel	Source	Direction	Tunnel Length (m)	Tunnel Length (mile)	Hourly FSP Emission (g/hr)																																															
					Hr 01		Hr 02		Hr 03		Hr 04		Hr 05		Hr 06		Hr 07		Hr 08		Hr 09		Hr 10		Hr 11		Hr 12		Hr 13		Hr 14		Hr 15		Hr 16		Hr 17		Hr 18		Hr 19		Hr 20		Hr 21		Hr 22		Hr 23			
					Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	Emission (g/hr)	
Teung Kean O Tunnel	Teung Kean O Tunnel (WB) Tunnel Portal at Kwan Tong Side	Teung Kean O Tunnel (WB)	857	1.88E+01	1.88E+01	1.33E+01	1.33E+01	1.01E+01	1.01E+01	7.89E+00	7.89E+00	7.89E+00	7.89E+00	1.33E+01	1.33E+01	2.03E+01	2.03E+01	3.87E+01	3.87E+01	4.42E+01	4.42E+01	6.89E+01	6.89E+01	7.05E+01	7.05E+01	5.91E+01	5.91E+01	5.91E+01	5.91E+01	5.91E+01	5.91E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	6.49E+01	
			871	2.21E+01	2.21E+01	1.60E+01	1.60E+01	1.23E+01	1.23E+01	9.71E+00	9.71E+00	9.70E+00	9.70E+00	1.61E+01	1.61E+01	3.18E+01	3.18E+01	7.03E+01	7.03E+01	1.01E+02	1.01E+02	7.80E+01	7.80E+01	8.47E+01	8.47E+01	7.08E+01	7.08E+01	7.08E+01	7.08E+01	7.08E+01	7.08E+01	7.08E+01	7.08E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01	7.47E+01

FSP Hourly Emission at Year 2017

Tunnel	Source	Direction	Tunnel Length (m)	Tunnel Length (mile)	Hourly FSP Emission Rate at Tunnel Portal (g/h)																																															
					Hr 01		Hr 02		Hr 03		Hr 04		Hr 05		Hr 06		Hr 07		Hr 08		Hr 09		Hr 10		Hr 11		Hr 12		Hr 13		Hr 14		Hr 15		Hr 16		Hr 17		Hr 18		Hr 19		Hr 20		Hr 21		Hr 22		Hr 23			
					Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)	Emission (g/h)
Teung Kean O Tunnel	Teung Kean O Tunnel (WB) Tunnel Portal at Kwan Tong Side	Teung Kean O Tunnel (WB)	857	6.16E-03	6.16E-03	4.45E-03	4.45E-03	3.42E-03	3.42E-03	2.70E-03	2.70E-03	2.70E-03	2.70E-03	4.45E-03	4.45E-03	6.76E-03	6.76E-03	1.06E-02	1.06E-02	1.24E-02	1.24E-02	1.92E-02	1.92E-02	2.19E-02	2.19E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02
			871	6.14E-03	6.14E-03	4.45E-03	4.45E-03	3.42E-03	3.42E-03	2.70E-03	2.70E-03	2.69E-03	2.69E-03	4.46E-03	4.46E-03	8.76E-03	8.76E-03	1.96E-02	1.96E-02	2.81E-02	2.81E-02	2.19E-02	2.19E-02	2.36E-02	2.36E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02

FSP Emission Inventory for Tunnel Portal Emission at 2017

Tunnel	Source	Source ID	Type	X (m)	Y (m)	Base Elevation (m)	Release Height (m)	Lateral Dim. (Sy) (m)	Vertical Dim. (Sz) (m)	Hourly FSP Emission Rate (g/s)																							
										Hr 00	Hr 01	Hr 02	Hr 03	Hr 04	Hr 05	Hr 06	Hr 07	Hr 08	Hr 09	Hr 10	Hr 11	Hr 12	Hr 13	Hr 14	Hr 15	Hr 16	Hr 17	Hr 18	Hr 19	Hr 20	Hr 21	Hr 22	Hr 23
										Tseung Kwan O Tunnel (WB) Tunnel Portal at Kwun Tong Side		TTW01	Volume	843056.2	819795.5	81.1	3.80	3.26	3.53	4.30E-04	3.08E-04	2.34E-04	1.83E-04	1.82E-04	3.09E-04	6.09E-04	1.36E-03	1.95E-03	1.53E-03	1.63E-03	1.37E-03	1.27E-03	1.24E-03