AIR QUALITY IN HONG KONG

1996

Air Services Group
Environmental Protection Department
Hong Kong Government

Air Quality in Hong Kong
1996

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Security Classification	:	Unrestricted

Summary

This report summarises the 1996 air quality monitoring results measured by the Environmental Protection Department's monitoring network.

Similar to previous years, levels of both total and respirable suspended particulates remained high. Two-thirds of the monitoring stations recorded non-compliance with either of statutory limits for these pollutants. Vehicles, in particular diesel vehicles, were the major contributors to the high air pollution levels.

The ambient sulphur dioxide and carbon monoxide levels maintained low and well within the objectives. However, more occurences of accumulation and photochemical oxidation of air pollutants emitted from vehicles leading to breaches of the short-term limits of gaseous air pollutants were observed in 1996. The 24-hourly air quality objective of nitrogen dioxide was violated at Sham Shui Po and Mong Kok stations. The hourly objective of ozone has also been violated for four and five times at Kwai Chung and Central/Western respectively.

In general, air pollutant concentrations were lower in summer times because of better dispersion capability and the washout effect of rainfall. The variations of air pollutant concentrations in a day are strongly associated with the daily human activities.

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1. Introduction

The Environmental Protection Department (EPD) operated in 1996 a network of nine air quality monitoring stations for measuring major air pollutants at locations shown in Figure 1. It aims to understand the air pollution problems of Hong Kong, assess how far the air quality objectives are being achieved and provide public information on current and forecast air quality. Further details of the monitoring operation and its associated quality control and assurance activities are given at Appendix A.

This report is a summary of the air pollutant measurements during 1996 in the monitoring network. Section 2 highlights the compliance status of the relevant air quality objectives. Sections 3 and 4 are the brief discussions of gaseous pollutants and particulate measurements respectively. Variations of air pollution concentrations over different time frames are discussed in section 5 The conclusion is at section 6. For easy reference, detailed measurement results of 1996 are tabulated and presented in Appendix B.

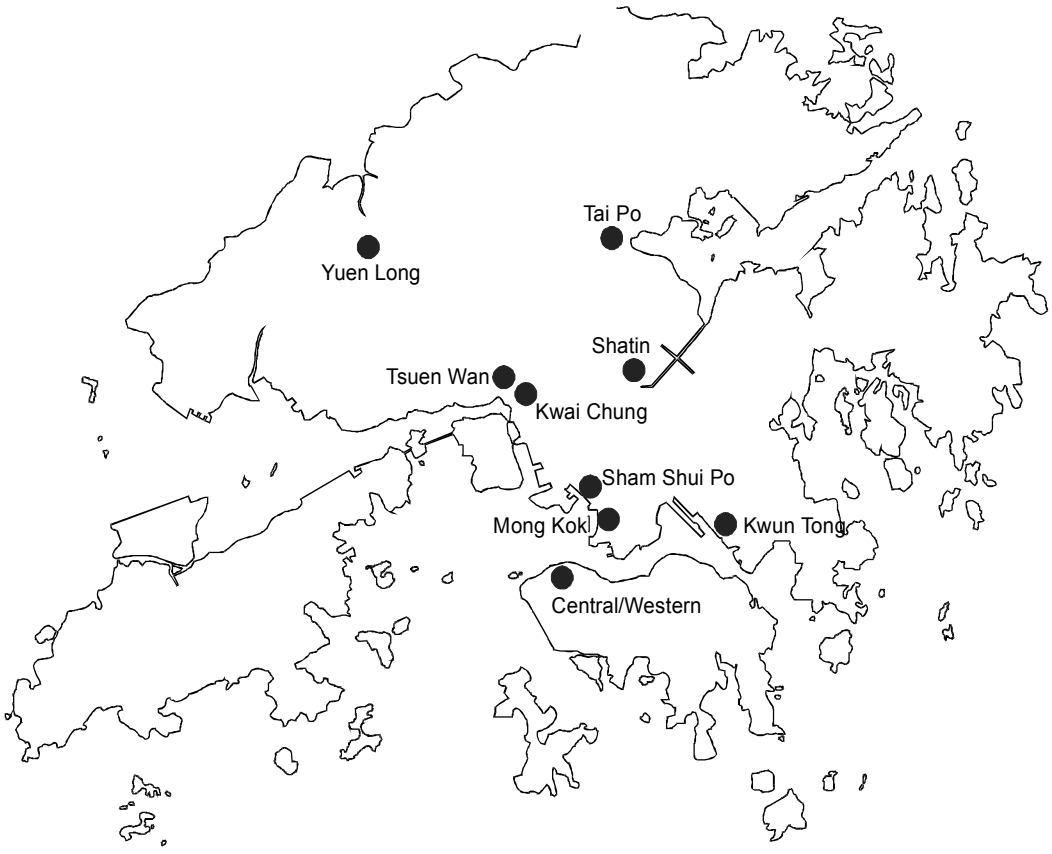


FIGURE 1 LOCATIONS OF EPD's AIR QUALITY MONITORING STATIONS

2. Air Quality Objectives and their Compliance Status

The Hong Kong Air Quality Objectives (HKAQO) which have been established to protect public health are presented in Table 1. As shown in Table 2, violations of these objectives in 1996 were seen at some monitoring stations. Similar to previous years, particulate pollution remains the greatest concern although a slight drop was observed in 1996. Six out of the nine monitoring stations recorded unacceptable annual total suspended particulates levels. For the respirable suspended particulates, four sites violated the annual HKAQO.

Table 1 Hong Kong Air Quality Objectives

Concentration in microgrammes per cubic metre

Pollutant	Averaging Time				
	1 h (2)	8 h (3)	24 h (3)	3 mo (4)	1 y (4)
Sulphur dioxide	800		350		80
Total suspended particulates (5)			260		80
Respirable suspended particulates (5)			180		55
Nitrogen dioxide	300		150		80
Carbon monoxide	30000	10000			
Photochemical oxidants (as Ozone (6))	240				
Lead				1.5	

(1) Measured at 298K (25°C) and 101.325 kPa (one atmosphere)
(2) Not to be exceeded more than three times per year
(3) Not to be exceeded more than once per year
(4) Arithmetic means
(5) Respirable suspended particulates means suspended particles in air with a nominal aerodynamic diameter of 10 micrometres and smaller
(6) Photochemical oxidants are determined by measurement of ozone only

Table 2 Air Quality Objectives Compliance Status

Station	Ozone	Nitrogen Dioxide			Total Suspended Particulates		Respirable Suspended Particulates	
	1-hour	1-hour	24-hour	1-year	24-hour	1-year	24-hour	1-year
Kwun Tong	--	✓	✓	✓	✓	X	✓	X
Sha Tin	--	✓	✓	✓	✓	✓	✓	✓
Tai Po	--	✓	✓	✓	✓	✓	✓	✓
Yuen Long	✓	✓	✓	✓	✓	X	✓	X
Sham Shui Po	--	✓	X	✓	✓	X	✓	X
Central/Western	X	✓	✓	✓	✓	X	✓	✓
Tsuen Wan	--	✓	✓	✓	✓	X	✓	✓
Kwai Chung	X	✓	✓	✓	✓	✓	✓	✓
Mong Kok	--	✓	X	✓	X	X	✓	X

Notes: "X" *violated the AQO* "--" *not measured*
"✓" *complied with the AQO*
Sulphur dioxide and carbon monoxide complied with the AQO

Ozone and nitrogen dioxide were the gaseous air pollutants with the measured concentrations violating the respective HKAQO in 1996. The hourly HKAQO for ozone was violated four and five times in 1996 at Kwai Chung and Central/Western respectively. For nitrogen dioxide, the daily HKAQO was fringed two times at both Sham Shui Po and Mong Kok sites.

3. Gaseous Pollutants

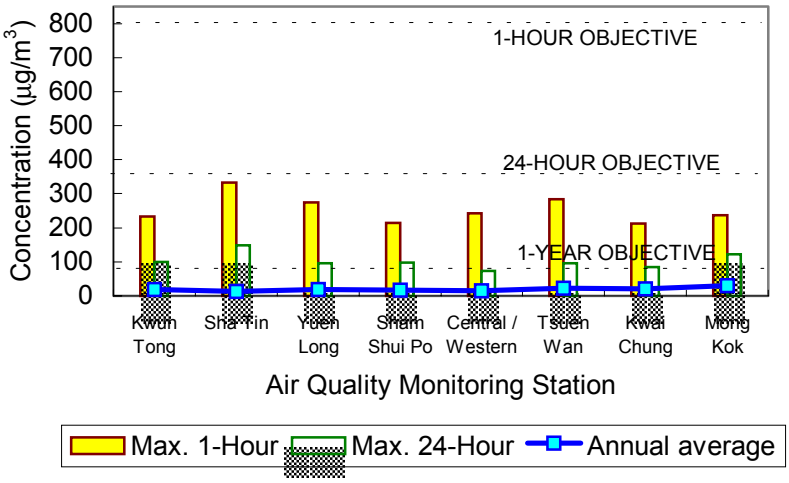
3.1 Sulphur Dioxide (SO_2)

Sulphur dioxide (SO_2) is formed primarily from combustion of fossil fuels containing sulphur. Diesel vehicles and industrial emissions are the more important sources in urban areas because of their proximity to the receptors.

Exposure to high levels of SO_2 may cause impairment of respiratory function and aggravate existing respiratory and cardiac illnesses. Prolonged exposure at lower levels may also increase the risk of developing chronic respiratory disease.

The monitoring results of SO_2 recorded at various monitoring stations in 1996 are depicted in Figure 2. Due to the past control efforts, the SO_2 concentrations have been maintaining at very low levels and none of the monitoring stations recorded violation of any relevant HKAQOs. Even for Mong Kok station which has the closest proximity to the sources, the highest readings for all different averaging time were less half of the respective permissible limits.

Figure 2: Sulphur Dioxide Monitoring 1996

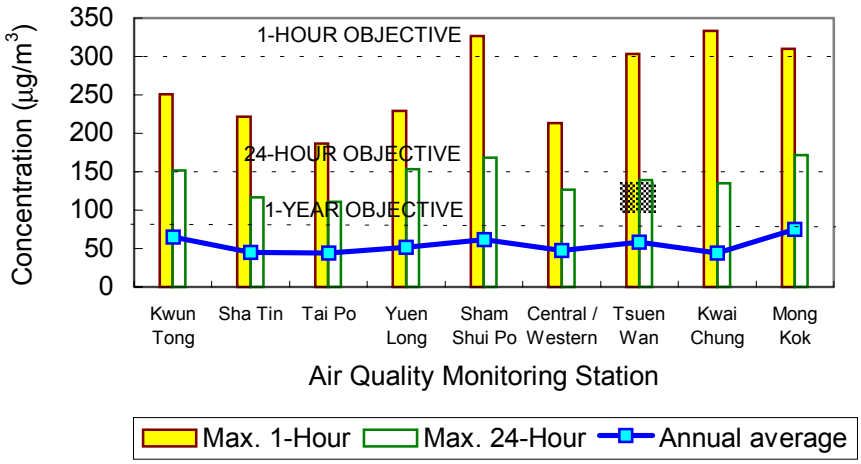


3.2 Nitrogen Dioxide (NO_2)

Nitrogen dioxide (NO_2) is formed by oxidation of nitric oxide emitted from fuel combustion from vehicles, power plants, incineration and aircraft. In urban areas, vehicles, especially the diesel vehicles, are the most important sources due to the proximity to the receptors. NO_2 can irritate the acute and chronic respiratory diseases.

As shown in Figure 3, the NO_2 concentrations were fairly high in Hong Kong. The accumulation and photo-chemical oxidation of the emissions from vehicles under calm wind conditions led to several violations of the short-term air quality objectives in the year. At Mong Kok, Tsuen Wan, Kwai Chung and Sham Shui Po sites, the hourly air quality objective was violated once each in 1996. Two violations of the 24-hourly objective were also observed at both Mong Kok and Sham Shui Po sites. The maximum 24-hour concentration for NO_2 was about 15% above the permissible limit. The annual averages were high: ranging from 55 to 94% of the HKAQO.

Figure 3: Nitrogen Dioxide Monitoring 1996

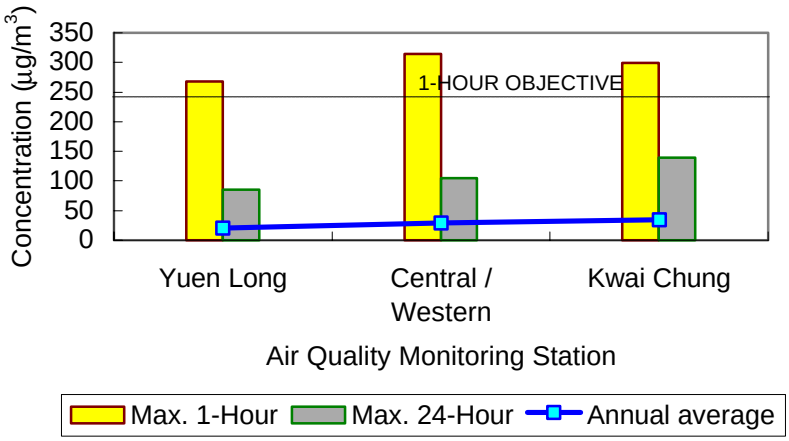


3.3 Ozone

Ozone (O_3) is formed by a series of complicated photochemical reactions of oxygen, nitrogen oxides and reactive hydrocarbons in the presence of sunlight. It is used to represent the photochemical oxidants which can irritate eye, nose and throat and increase susceptibility to respiratory infections at elevated levels.

In 1996, the AQO limit for O_3 was violated more than three times at both Kwai Chung and Central/Western sites. These violations related to photochemical reactions from sunshine on a very hot afternoon. The levels for the 3 sites with O_3 measurements are shown in Figure 4.

Figure 4: Ozone Monitoring 1996

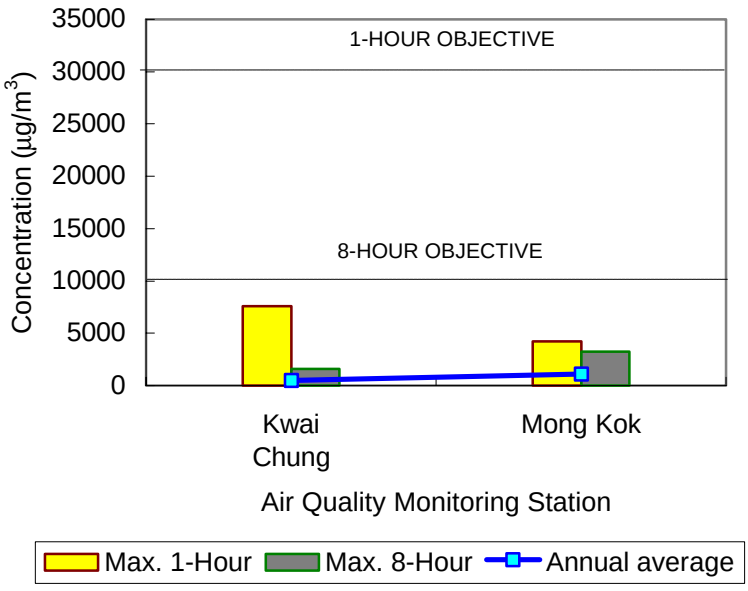


3.4 Carbon Monoxide

Carbon monoxide (CO) comes mainly from vehicular emissions although small amount of which may also be arisen from incomplete combustion of fuels from factories and power stations. It can reduce oxygen delivery to the body's organs and tissues when it enters the bloodstream. The health threat from CO is more important for those who suffer from heart disease.

In 1996, CO levels remained low and the concentrations were less than one-third of the acceptable limits. Figure 5 shows the CO levels at Mong Kong and Kwai Chung.

Figure 5: Carbon Monoxide Monitoring 1996



4. Particles

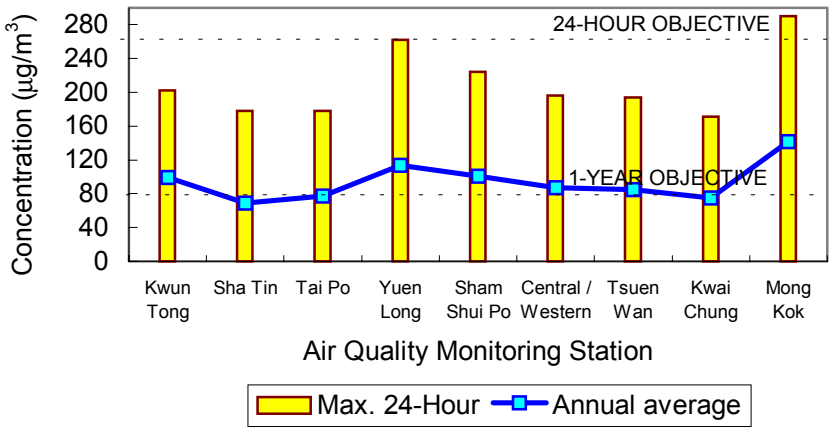
4.1 Total Suspended Particulates (TSP)

Total suspended particulates (TSP) are small airborne particles such as dust, fume and smoke with diameters less than 100 micrometres. They are emitted from various sources including power stations, construction activities, incineration and vehicles.

The fine portion, which are known as the respirable suspended particulates below, are of greater health concern. The coarse particles are mainly related to soiling and dust nuisance.

Levels of TSP in 1996 are depicted in Figure 6. The concentrations remained high throughout the territory although a slight decrease in the overall concentration was noted when compared with the figures of 1995. Six out of the nine monitoring stations recorded violation of the annual air quality objective. The highest annual level at the street site of Mong Kok was almost 78% above the limit. Due to closer proximity to emissions from vehicles and surrounding construction activities, it also recorded two violations of the 24-hour AQO limit. Same as previous years, Sha Tin recorded the lowest annual level which was about 86% of the permissible limit.

Figure 6: TSP Monitoring 1996
(High volume sampling)



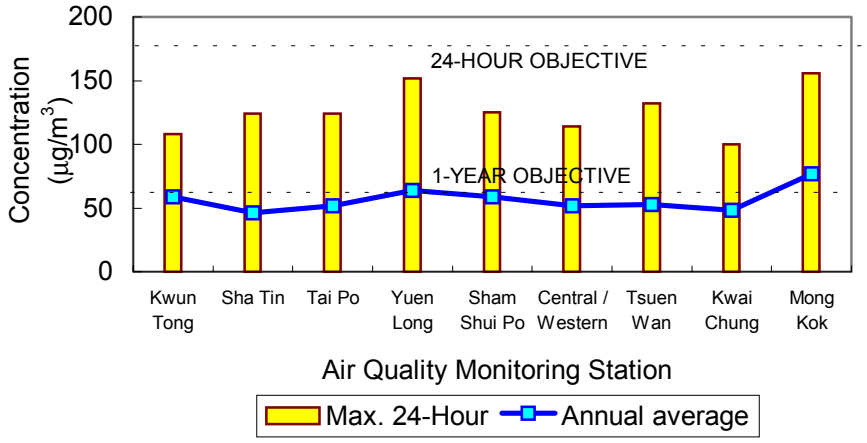
4.2 Respirable Suspended Particulates (RSP)

Respirable suspended particulates (RSP) are airborne particles with diameters of 10 micrometres or less. Apart from combustion sources, in particular diesel vehicles, atmospheric oxidation of sulphur dioxide and nitrogen oxides and to a less extent, the crustal dust and marine aerosols are also a significant sources of RSP.

RSP may cause chronic and acute effects on human health, particularly the pulmonary function, when exposed at high level as they can penetrate deep into the lungs and cause respiratory problems. These effects are enhanced if high RSP levels are associated with higher levels of other pollutants, such as SO_2. Smaller particles in RSP will also have a major impact on visibility.

The RSP concentrations recorded in 1996 at various station are shown in Figure 7.

Figure 7: RSP Monitoring 1996
(High volume sampling)



There was one violation of the 24-hour AQO limits at Kwun Tong. The annual RSP levels were also high. Four sites, viz., Kwun Tong, Yuen Long, Sham Shui Po and Mong Kok, violated the annual AQO for RSP in 1996. The highest annual level at the street site of Mong Kok was almost 40% above the limit. Diesel vehicle emissions were the major cause of the high RSP concentrations. Same as TSP, Sha Tin recorded the lowest annual level of about 84% of the permissible limit.

4.3 Lead

Lead in airborne dust mainly comes from combustion of leaded petrol. Due to the reduction of lead in petrol programme, the ambient lead concentrations remained very low in 1996. Higher lead content was found at the Yuen Long station. It was possibly caused by high traffic flow and industrial activities in the surrounding area.

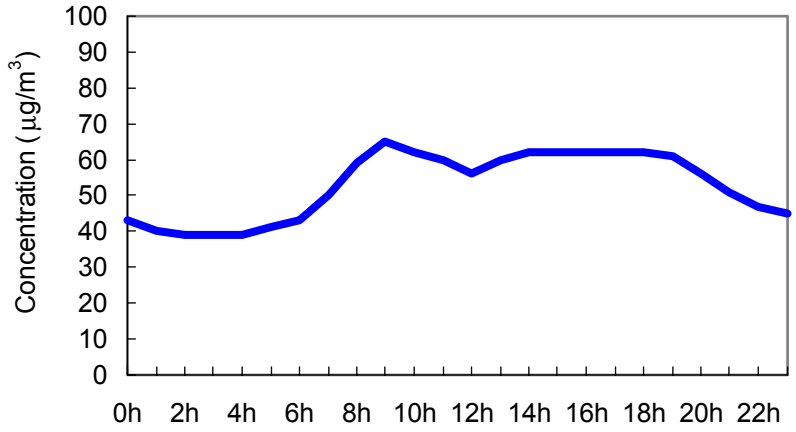
5. VARIATION OF AIR POLLUTION LEVELS OVER TIME

The air pollutant concentration in the atmosphere can change over a day, over the months of year and in the periods of several years.

5.1 Over a day

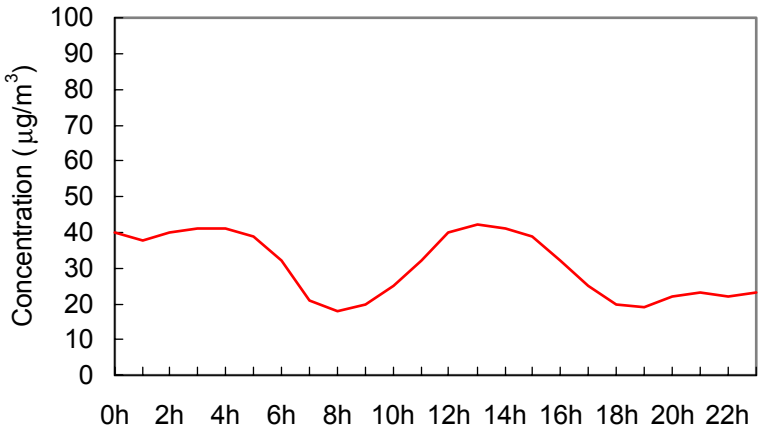
The daily change of the concentrations of most air pollutants, other than ozone and those formed by atmospheric chemical reactions of other air pollutants, follows closely to the pattern of human activities. Figure 8 is a typical time averaged pattern of RSP concentrations at Central/Western in 1996. Higher concentration is observed in the morning and in the late afternoon when more traffic and other activities occur. The lowest concentration occurs at night hours when human activities are usually at their lowest.

Figure 8: Hourly variations of RSP 1996 (Central/Western)



The typical daily variation of ozone concentrations in 1996, as depicted in Figure 9, shows a slightly different daily pattern. As ozone is produced from reaction of the emissions from vehicles in the presence of sunlight, the levels built up in the afternoon when the solar radiation levels are the highest. Minimum concentrations were observed at rush hours when nitric oxide emissions from vehicles were destroying ozone.

Figure 9: Hourly variations of Ozone 1996 (Central/Western)



5.2 Over a year

Typical patterns of average concentrations of particulates and nitrogen dioxide over 1996 are shown in Figure 10. Because of the washout effects of rainfall and/or better dispersion of pollutant, the air pollution levels were substantially lower in the summer months. Higher concentrations were, in general, observed in winter as the weather conditions that trap the pollutants close to their sources and hinder pollutant dispersion occur during this period.

The patterns for sulphur dioxide and ozone vary slightly from others, as shown in Figure 11. The former did not show significant variation throughout the year as the higher emissions in the summer months as a result of higher electricity demand during these time of the year might offset the decreases by washout and dispersion effects mentioned above. For ozone, higher average concentrations occurred in May, September and October as these months would have more clear and sunny days to provide suitable conditions for photochemical formation of ozone from vehicle emissions.

Figure 10: Monthly variations of NO2 and RSP 1996 (Central/Western)

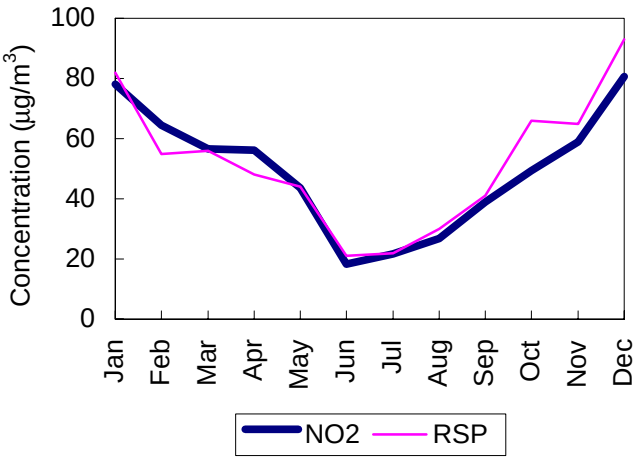
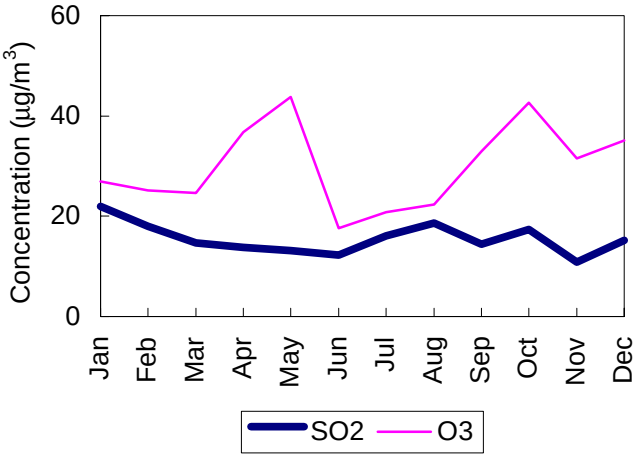


Figure 11: Monthly variations of SO2 and O3 1996 (Central/Western)

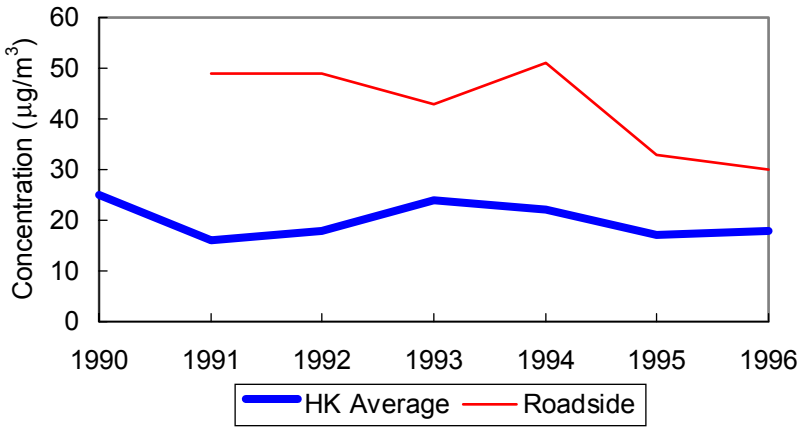


5.3 Long Term Trends

5.3.1 Sulphur Dioxide (SO_2)

Since the enforcement of the Air Pollution Control (Fuel Restriction) Regulations for stationary and the more recent Air Pollution Control (Vehicle Fuel) Regulation for mobile sources, the SO_2 concentration has reduced and maintained at low levels far below the statutory limit of 80 ug/m^3 (Figure 12). For example, at roadside site, the 1995 and 1996 annual average were about 35-40% lower than that before enforcement of the latter regulation. With the further tightening on the sulphur content of diesel fuel for mobile vehicles, the SO_2 pollution should become less significant in the future.

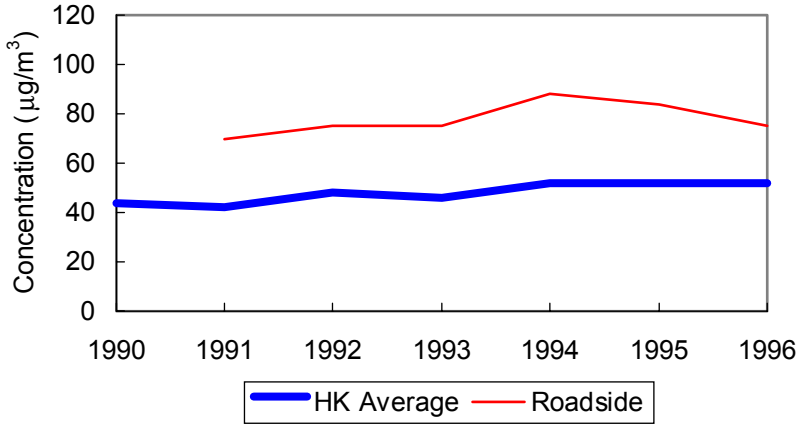
Figure 12: SO2 long term trend (HK average and Roadside)



5.3.2 Nitrogen Dioxide (NO_2)

Both the average overall and roadside concentrations of NO_2 have been increased by about 20% when comparing with the respective levels of 1991.(Figure 13)These were likely caused by the increases of traffic volume of diesel vehicles. Due to closer proximity to the sources, the levels at roadsides were very close to or even higher than the permissible limits in recent years.

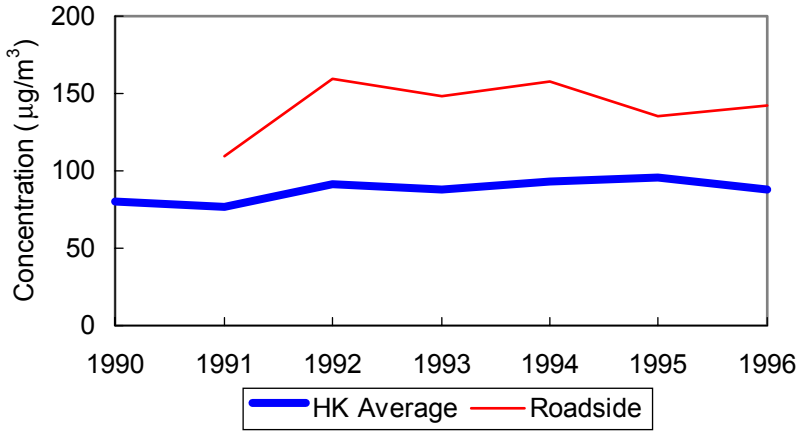
Figure 13: NO2 long term trend (HK average and Roadside)



5.3.3 Total Suspended Particulates (TSP)

The TSP levels have been maintaining high and at roughly similar concentrations since 1992 (Figure 14). For Mong Kok, the concentrations were as high as 100% above the permissible limit of 80 ug/m^3 due to the close proximity to the sources.

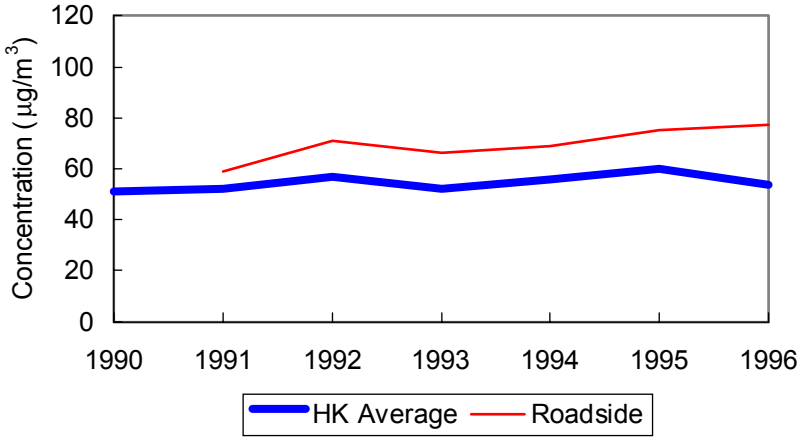
Figure 14: TSP long term trend (HK average and Roadside)



5.3.4 Respirable Suspended Particulates (RSP)

The overall and roadside RSP concentration exhibit slightly different long term trends, as shown in Figure 15. The former seems to level off after peaked in 1992 with the concentrations fluctuating around the permissible limit of 55 ug/m^3. For the latter, the increasing trend continues, indicating that the contribution from vehicle emissions, especially those from diesel vehicles, are becoming more important.

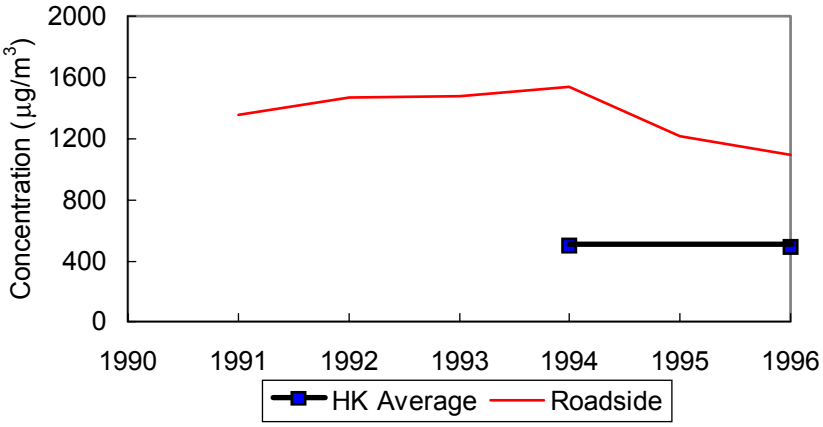
Figure 15: RSP long term trend (HK average and Roadside)



5.3.5 Carbon monoxide (CO)

Figure 16 shows the roadside and overall CO concentrations in the past few years. Both concentrations remained low and did not vary significantly though a slight decrease was observed at the roadside station at Mong Kok.

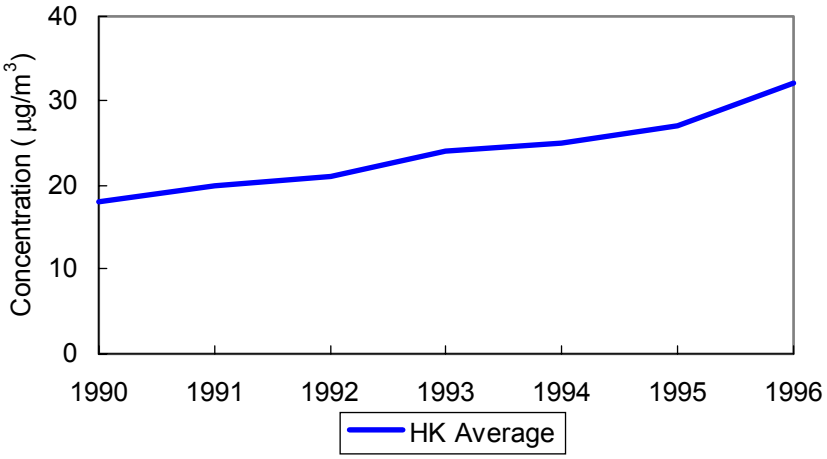
Figure 16: CO long term trend (HK average and Roadside)



5.3.6 Ozone(O_3)

The ozone formed by photochemical oxidation is becoming more serious as shown by its increasing trends in Figure 17. The annual Hong Kong average for ozone increased more than 80% in the past seven years. It is possible that ozone will emerge as a future air pollution issue needs to be addressed

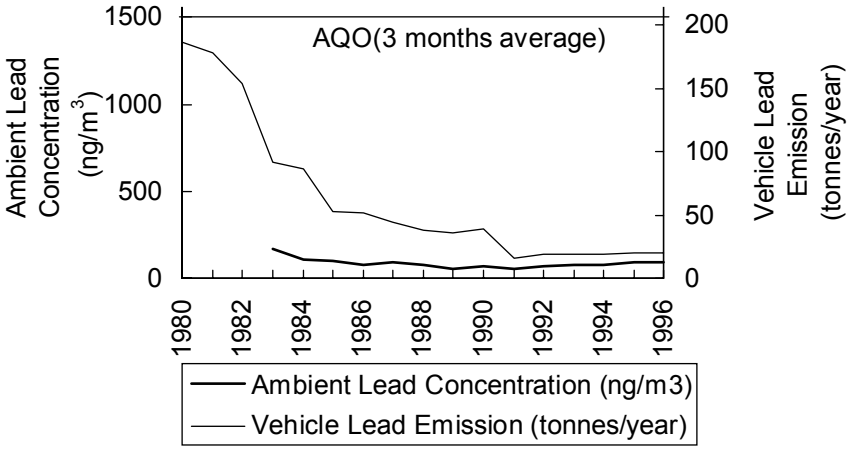
Figure 17: O3 long term trend (HK average)



5.3.7 Airborne Lead

The lead content in petrol was reduced by almost 90% in the eighties after the oil companies had taken voluntary action. The ambient lead concentration was low when the unleaded petrol was used from April, 1992. As shown in Figure 18, the lead in the atmosphere has been maintained at very low level since eighties.

Figure 18. Vehicle Lead Emission and Ambient Lead Concentration



6. Conclusion

In 1996, ambient concentrations of nitrogen dioxide, total suspended particulates and respirable suspended particulates remained the greatest air pollution concern in Hong Kong although a slight decrease in particulates concentration was observed. The increasing ozone trend and more frequent violations of hourly ozone limit suggest that photochemical oxidation may become more and more active in Hong Kong. In contrast, sulphur dioxide levels were all well below the limits and further reduction is expected in next few years. Lead and carbon monoxide levels also remained low.

Appendix A

AIR QUALITY MONITORING OPERATION

A.1 Network Operation

The air quality network of nine monitoring stations is operated by the Air Services Laboratory (ASL) of the Environmental Protection Department. The ASL has been accredited by the Hong Kong Laboratory Accreditation Scheme (HOKLAS) since August 1995 for the measurement of ambient concentrations of total suspended particulates (TSP), respirable suspended particulates (RSP), sulphur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3) and carbon monoxide (CO).

In order to provide good representation of the air quality in areas of high population density, the locations of the nine monitoring stations were carefully chosen by referencing to the United States Environmental Protection Agency's (USEPA) guidelines with practical consideration of the unique congested high-rise development of Hong Kong (see Table A1).

The details for the parameters monitored at each monitoring station and a list of equipment employed for measuring the air pollutants are summarised in Tables A2 and A3 respectively. In general, the concentration of gaseous pollutants and RSP are determined continuously by automatic analysers. Manually operated high volume samplers using the gravimetric methods are also used regularly to measure the TSP and RSP. In addition, meteorological parameters, including temperature and solar radiation, wind speed and direction, are also recorded continuously at each station as appropriate.

Wet and dry deposition samples are collected at 2 stations: Central/Western and Kwun Tong. The parameters measured for all wet and dry samples include: Si, Al, Ca, Fe, Mg, V, Mn, Cu and Ba in the residue; and pH, Na^+, K^+, NH_4^+, NO_3^-, $SO_4^=$, Cl^-, Ca^{2+}, Mg^{2+}, formate and acetate.

A.2 Data Processing and Dissemination

At each monitoring station, signals from the continuous analysers and the meteorological instruments are sent to a data logger and then to a computer at the ASL's Air Quality Laboratory via telephone lines. After checking and validation, the measurements are made available for use and the monitoring data are disseminated to the public in the following manner:-

Monthly release of the monitoring data of three stations, Mong Kok, Kwai Chung and Central and Western;

Daily reporting of the Air Pollution Index (API) and Forecast of three categories of land-use areas, viz., urban (i.e., Central and Western and Sham Shui Po), industrial (i.e., Kwun Tong, Kwai Chung and Tsuen Wan) and new development (i.e., Sha Tin, Tai Po and Yuen Long) since June 1995. The announcement of API will enable everyone, particularly susceptible groups, such as people with heart or respiratory illness, to consider taking precautionary measures when necessary.

Reporting in the Air Quality in Hong Kong series and annual Environment Hong Kong;

Ad hoc provision of air quality data to public, academics for research, and consultants for air quality assessment upon request.

The monitoring results are also regularly used to assist the formulation the air quality management plan and evaluation the effectiveness of the current air pollution control programmes.

A3. Quality Control and Assurance

A quality policy is adopted to ensure that ambient air quality monitoring results from the monitoring stations attain a high degree of accuracy and precision. A quality system has been established in accordance with HOKLAS criteria.

The accuracy of the monitoring network is assessed by performance audits. Similar to overseas standards, warning limits of ±7% and control limits of ±10% are adopted. In 1996, 149 audit checks were carried out on the stations' analyzers and samplers. As shown in Figure A1 and based on the 95% probability limits, the accuracy of the network varied between -8.9% and 7.4%, which was within the control limit of ±10%.

The precision, a measure of the repeatability, of the measurements is checked in accordance with USEPA requirements. In 1996, 618 precision checks were carried out on the analyzers and samplers. As shown in Figure A2 and based on the 95% probability limits, the precision of the network varied between -8.5% and 7%, which was again within the target of ±10%.

In addition to the above operations, a system audit to review the quality assurance activities is carried out on an annual basis on the monitoring network. A report outlining the deficiencies and corrective actions is compiled at the end of the audit.

Table A1. Fixed Network Monitoring Stations: Site Information

Station	Abbr.	Address	Area Type	Sampling Height (Above P.D.H.K.)	Above Ground	Date Start Operation
Kwun Tong (City District Office)	KT	6 Tung Yan Street, Kwun Tong	Industrial: Industrial (to West) Residential (to East) Urban : Residential	34m	25m (6 floors)	Jul 83
Central/Western (Upper Level Police Station)	C/W	1 High Street, Sai Ying Pun	Urban : Residential	78m	18m (4 floors)	Nov 83
Sham Shui Po (Police Station)	SSP	37A Yen Chow St., Sham Shui Po	Urban : Mixed Commercial/ Residential/Industrial	21m	17m (4 floors)	Jul 84
Kwai Chung (Chen Zao Man College)	KC	1-5 Kwai Hop St., Kwai Hing	Industrial: Mixed Industrial/Residential	82m	25m (6 floors)	Jul 88
Tsuen Wan (Princess Alexandra Community Centre)	TW	60 Tai Ho Rd., Tsuen Wan	Industrial: Mixed Commercial/Residential	21m	17m (4 floors)	Aug 88
Tai Po (Tai Po Govt. Office Bldg.)	TP	1 Ting Kok Rd., Tai Po	New Development Residential	31m	25m (6 floors)	Feb 90
Sha Tin (Sha Tin Govt. Secondary School)	ST	11-17 Man Lai Rd., Tai Wai, Sha Tin	New Development Mixed Residential/Industrial	27m	21m (5 floors)	Jul 91
Mong Kok (Mong Kok Rd. Pumping Station)	MK	4E Mong Kok Rd., Mong Kok	Ground Level Monitoring Station	7m	2m (1 floor)	Apr 91
Yuen Long (Yuen Long District Branch Offices Bldg.)	YL	269 Castle Peak Road Yuen Long	New Development Residential	31m	25m (6 floors)	July 95

Note : P.D. = Principal datum

Table A2. SUMMARY OF THE PARAMETERS MONITORED IN THE NETWORK

	PARAMETERS									
STATIONS	SO_2	NO_x	NO	NO_2	CO	O_3	TEOM	MET	TSP	RSP
Kwun Tong	X	X	X	X			X	X	X	X
Central/Western	X	X	X	X		X	X	X	X	X
Sha Tin	X	X	X	X			X	X	X	X
Tai Po		X	X	X				X	X	X
Mong Kok	X	X	X	X	X		X	X	X	X
Sham Shui Po	X	X	X	X				X	X	X
Tsuen Wan	X	X	X	X			X	X	X	X
Kwai Chung	X	X	X	X	X	X	X	X	X	X
Yuen Long	X	X	X	X		X	X	X	X	X

Table A3 List of Equipment Used In Measuring Air Pollutant Concentrations

Pollutants	**Measurement Principle**	**Commercial Instrument**
SO_2	UV fluorescence	TECO Model 43A Monitor Laboratories 8850
NO, NO_2, NO_x	Chemiluminescence	TECO Model 42 Monitor Laboratories 8840
O_3	UV absorption	TECO 49
SO_2, NO_2 O_3	Differential Optical Absorption Spectroscopy	OPSIS AR500
CO	Non-dispersive infra-red absorption with gas filter correlation	TECO Model 48
TSP	Gravimetric	General Metal 2310
RSP	a) Gravimetric b) Oscillating microbalance	Graseby Andersen PM10 R&P TEOM Series 1400a-PM10

Figure A1: Accuracy of Air Quality Monitoring Network, 1996

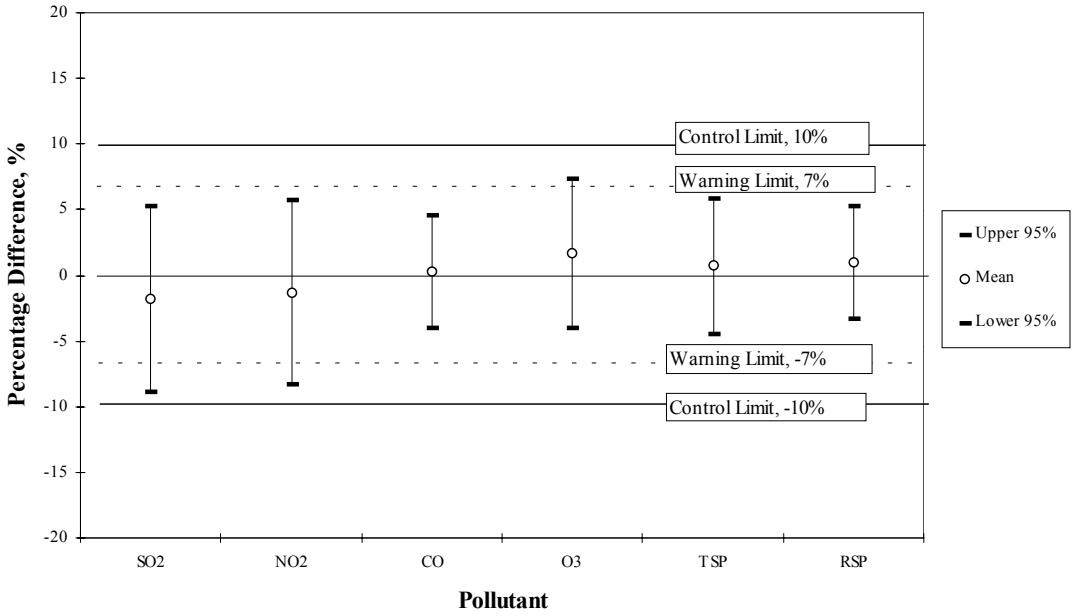
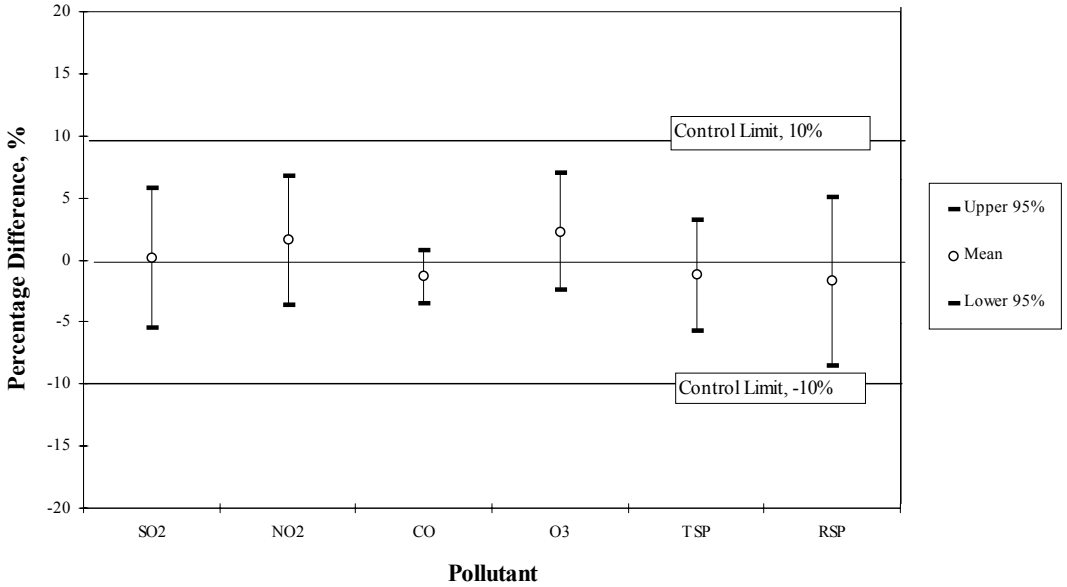


Figure A2: Precision of Air Quality Monitoring Network, 1996



Appendix B

Tables of Air Quality Data

Table No.	Table Title
B1.	The Highest 4 Hourly and 2 Daily Pollutant Values for the year 1996
B2.	Monthly and annual averages of gaseous pollutants
B3.	Statistical analysis of the hourly measurements of gaseous pollutants
B4.	Monthly and annual averages of particulate concentrations
B5.	Airborne species concentrations, derived from Total Suspended Particulates and expressed as percentage by weight
B6.	Airborne species concentrations, derived from Respirable Suspended Particulates and expressed as percentage by weight
B7.	Total wet and dry deposition for 1996
B8.	Variation of Air Pollutant Concentrations

TABLE B1 THE HIGHEST 4 HOURLY AND 2 DAILY POLLUTANT VALUES FOR THE YEAR 1996

Hourly Concentrations

Pollutant: Sulphur Dioxide

Station	1st High	2nd High	3rd High	4th High
Kwun Tong	234	230	212	207
Sha Tin	332	316	298	278
Yuen Long	275	261	237	235
Sham Shui Po	215	208	193	187
Central / Western	242	189	168	167
Tsuen Wan	284	237	231	220
Kwai Chung	213	194	176	175
Mong Kok	237	237	221	214

Pollutant: Nitrogen Oxides

Station	1st High	2nd High	3rd High	4th High
Kwun Tong	1591	1529	1392	1344
Sha Tin	1173	1014	815	786
Tai Po	935	748	743	740
Yuen Long	873	821	781	766
Sham Shui Po	1534	1281	1183	1072
Central / Western	881	812	770	748
Tsuen Wan	915	877	876	869
Kwai Chung	834	736	645	631
Mong Kok	1504	1324	1257	1233

Pollutant: Nitric Oxide

Station	1st High	2nd High	3rd High	4th High
Kwun Tong	884	855	771	745
Sha Tin	664	543	454	443
Tai Po	539	429	411	397
Yuen Long	487	440	425	412
Sham Shui Po	830	680	627	611
Central / Western	459	459	446	429
Tsuen Wan	525	505	484	472
Kwai Chung	446	409	343	313
Mong Kok	791	719	715	714

Pollutant: Nitrogen Dioxide

Station	1st High	2nd High	3rd High	4th High
Kwun Tong	251	240	239	237
Sha Tin	222	216	195	193
Tai Po	187	175	173	172
Yuen Long	229	225	203	199
Sham Shui Po	327	293	265	251
Central / Western	213	182	181	179
Tsuen Wan	303	254	221	221
Kwai Chung	333	267	187	185
Mong Kok	310	297	295	293

Pollutant: Carbon Monoxide

Station	1st High	2nd High	3rd High	4th High
Kwai Chung	7610	1810	1800	1620
Mong Kok	4240	4180	4080	3990

Pollutant: Ozone

Station	1st High	2nd High	3rd High	4th High
Yuen Long	268	263	256	223
Central / Western	314	283	278	271
Kwai Chung	299	266	259	247

Daily Concentrations

Pollutant: Total Suspended Particulates (High volume sampling)

Station	1st High	2nd High
Kwun Tong	202	200
Sha Tin	178	172
Tai Po	178	165
Yuen Long	262	242
Sham Shui Po	224	203
Central / Western	196	184
Tsuen Wan	194	189
Kwai Chung	171	157
Mong Kok	290	278

Daily Concentrations

Pollutant: Sulphur Dioxide

Station	1st High	2nd High
Kwun Tong	99	95
Sha Tin	148	78
Yuen Long	95	81
Sham Shui Po	97	84
Central / Western	74	64
Tsuen Wan	95	86
Kwai Chung	85	84
Mong Kok	122	118

Pollutant: Nitrogen Oxides

Station	1st High	2nd High
Kwun Tong	561	543
Sha Tin	387	368
Tai Po	378	305
Yuen Long	315	307
Sham Shui Po	504	494
Central / Western	376	347
Tsuen Wan	433	372
Kwai Chung	294	266
Mong Kok	684	576

Pollutant: Nitric Oxide

Station	1st High	2nd High
Kwun Tong	267	261
Sha Tin	180	175
Tai Po	174	141
Yuen Long	124	116
Sham Shui Po	222	213
Central / Western	194	171
Tsuen Wan	231	172
Kwai Chung	134	107
Mong Kok	335	289

Pollutant: Nitrogen Dioxide

Station	1st High	2nd High
Kwun Tong	152	144
Sha Tin	117	116
Tai Po	111	106
Yuen Long	153	143
Sham Shui Po	168	164
Central / Western	127	122
Tsuen Wan	139	129
Kwai Chung	135	115
Mong Kok	172	159

Pollutant: Carbon Monoxide *

Station	1st High	2nd High
Kwai Chung	1600	1330
Mong Kok	3240	2970

Pollutant: Ozone

Station	1st High	2nd High
Yuen Long	85	75
Central / Western	105	95
Kwai Chung	139	108

Pollutant: Respirable Suspended Particulates (High volume sampling)

Station	1st High	2nd High
Kwun Tong	108	106
Sha Tin	124	123
Tai Po	124	118
Yuen Long	152	149
Sham Shui Po	125	117
Central / Western	114	110
Tsuen Wan	132	124
Kwai Chung	100	100
Mong Kok	156	156

Note: 1. All units are in micrograms per cubic metre.
*2. * Carbon Monoxide's value is 8-Hour Average.*

TABLE B2 MONTHLY AND ANNUAL AVERAGES OF GASEOUS POLLUTANTS FOR 1996

Pollutant: Sulphur Dioxide

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Kwun Tong	19	16	11	13	14	20	28	43	16	18	16	20	19
Sha Tin	16	11	10	11	13	16	16	16	9	12	11	19	13
Yuen Long	28	17	16	12	8	17	22	22	16	16	17	32	18
Sham Shui Po	24	15	20 *	11 *	18	17	23	29	16	18	15	24	18
Central / Western	22	18	15	14	13	12	16	19	14	17	11	15	15
Tsuen Wan	22	15	22	21	26	25	28	26	18	17	18	28	22
Kwai Chung	21	15	21	14	27	30	33	30	13	13	12	23	21
Mong Kok	32	23	24	23	27	33	44	45	29	32	27	28	30

Pollutant: Nitrogen Oxides

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Kwun Tong	233	208	185	164	176	164	172	211	158	170	177	213	182
Sha Tin	126	100	97	77	84	68	57	99	79	84	75	178	92
Tai Po	121	80	90	74	73	74	68	93	82	86	86	143	86
Yuen Long	138	92	110	76	72	83	81	107	94	105	105	185	102
Sham Shui Po	197	149	176	133 *	147	114	121	149	131 *	127	125	171	132
Central / Western	126	111	104	98	86	45	57	96	68	71	90	128	86
Tsuen Wan	155	134	175	161	161	112	120	139	120	115	117	182	133
Kwai Chung	83	80	97	78	86	76	71	91	57	62	60	108	77
Mong Kok	330	270	284	245	260	220	267	298	256	288	287	310	258

Pollutant: Nitric Oxide

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Kwun Tong	98	87	79	61	70	82	83	103	66	63	69	82	77
Sha Tin	44	32	31	18	26	25	18	41	26	24	20	69	31
Tai Po	40	20	28	17	19	30	23	35	26	24	25	52	27
Yuen Long	43	26	38	22	25	35	32	44	29	26	24	56	33
Sham Shui Po	71	50	65	43 *	50	50	50	65	39 *	33	37	54	47
Central / Western	32	31	31	27	27	18	23	45	19	15	20	30	25
Tsuen Wan	53	45	70	57	61	50	52	60	42	32	35	58	49
Kwai Chung	18	19	31	20	27	31	26	33	12	9	10	25	21
Mong Kok	152	120	133	103	118	119	139	155	119	125	127	130	120

Pollutant: Nitrogen Dioxide

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Kwun Tong	84	75	64	71	69	39	45	54	58	73	71	89	65
Sha Tin	59	51	49	49	44	29	28	36	39	48	44	72	45
Tai Po	59	49	46	48	44	29	33	40	42	49	48	63	44
Yuen Long	72	53	53	42	34	29	32	40	50	64	69	99	52
Sham Shui Po	90	72	78	67 *	71	38	45	50	73 *	85	68	88	62
Central / Western	78	64	57	56	44	18	22	27	39	49	59	81	47
Tsuen Wan	74	65	68	74	68	35	40	46	55	66	64	93	59
Kwai Chung	55	50	49	47	44	28	32	41	39	47	45	69	44
Mong Kok	99	87	80	88	81	39	54	61	74	96	92	111	75

Pollutant: Carbon Monoxide

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Kwai Chung					520	320	290	460	450	570	700	720	490 *
Mong Kok	1460	1210	1210	1090	1120	820	910	1080	1150	1040	1090	1220	1100

Pollutant: Ozone

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Yuen Long	24	28	16	9	10	12	16	15	26	38	34	26	20
Central / Western	27	25	25	37	44	18	21	22	33	43	32	35	29
Kwai Chung	42	40	34	49	47	8	16	13	35	52	44	39	34

Notes: *1. All units are in micrograms per cubic metre.*
2. Value with an '' is below the minimum data requirement for no. of data within the period.*
3. Shaded value is below the minimum data requirement for no. of data within a quarter.

TABLE B3 STATISTICAL ANALYSIS OF THE HOURLY MEASUREMENTS OF GASEOUS POLLUTANTS FOR 1996

Pollutant: Sulphur Dioxide

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 24 hour
Kwun Tong	8264	94.3	3	7	13	22	41	66	98	118	11	19	234	99
Sha Tin	8324	95.0	0	3	8	16	31	45	68	82	7	13	332	148
Yuen Long	8118	92.7	4	7	13	24	38	53	83	104	12	18	275	95
Sham Shui Po	7479	85.4	3	8	14	22	43	65	96	115	12	18	215	97
Central / Western	8255	94.2	3	6	11	19	31	47	72	92	9	15	242	74
Tsuen Wan	8288	94.6	5	9	16	27	47	64	92	113	14	22	284	95
Kwai Chung	8086	92.3	3	6	13	27	51	70	95	113	12	21	213	85
Mong Kok	8221	93.8	8	13	23	38	64	87	118	139	22	30	237	122

Pollutant: Nitrogen Oxides

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 24 hour
Kwun Tong	7815	89.2	33	116	179	244	320	372	457	542	142	182	1591	561
Sha Tin	7768	88.7	17	32	60	109	214	333	458	549	59	92	1173	387
Tai Po	7728	88.2	25	43	69	107	168	226	349	438	67	86	935	378
Yuen Long	7831	89.4	33	55	84	127	196	255	357	429	82	102	873	315
Sham Shui Po	7676	87.6	36	89	134	182	248	306	407	510	117	132	1534	504
Central / Western	7678	87.6	24	39	72	115	176	226	316	405	68	86	881	376
Tsuen Wan	7644	87.3	31	86	129	181	249	301	396	462	110	133	915	433
Kwai Chung	7830	89.4	15	35	61	102	163	214	283	335	55	77	834	294
Mong Kok	7588	86.6	86	168	259	361	467	537	654	751	233	258	1504	684

Pollutant: Nitric Oxide

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 24 hour
Kwun Tong	7815	89.2	4	38	69	107	153	186	235	279	45	77	884	267
Sha Tin	7768	88.7	0	2	10	32	91	159	232	280	9	31	664	180
Tai Po	7728	88.2	1	6	14	34	70	103	167	224	13	27	539	174
Yuen Long	7831	89.4	3	9	22	43	76	108	158	196	18	33	487	124
Sham Shui Po	7676	87.6	3	20	41	66	102	137	200	256	29	47	830	222
Central / Western	7678	87.6	1	4	13	32	67	97	153	209	11	25	459	194
Tsuen Wan	7644	87.3	2	20	42	69	105	136	194	240	29	49	525	231
Kwai Chung	7830	89.4	0	2	10	30	57	81	119	150	9	21	446	134
Mong Kok	7588	86.6	26	66	117	177	234	277	340	408	96	120	791	335

Pollutant: Nitrogen Dioxide

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 24 hour
Kwun Tong	7815	89.2	23	40	65	87	108	123	146	166	56	65	251	152
Sha Tin	7763	88.6	15	25	39	59	85	107	134	147	37	45	222	117
Tai Po	7728	88.2	19	28	41	58	78	93	113	125	39	44	187	111
Yuen Long	7831	89.4	21	30	44	68	97	117	146	164	45	52	229	153
Sham Shui Po	7676	87.6	28	41	63	92	117	133	152	168	60	62	327	168
Central / Western	7674	87.6	16	23	45	69	92	109	129	143	40	47	213	127
Tsuen Wan	7644	87.3	24	37	57	81	108	126	146	159	53	59	303	139
Kwai Chung	7830	89.4	13	26	38	57	87	112	136	152	36	44	333	135
Mong Kok	7588	86.6	34	50	76	106	131	146	170	188	70	75	310	172

Pollutant: Carbon Monoxide

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 8 hour
Kwai Chung	5502	62.8	240	320	450	650	830	960	1130	1230	450	490	7610	1600
Mong Kok	8314	94.9	570	780	1070	1390	1710	1950	2270	2590	1020	1100	4240	3240

Pollutant: Ozone

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 24 hour
Yuen Long	8258	94.3	1	4	12	28	54	74	97	118	10	20	268	85
Central / Western	8267	94.4	3	10	22	44	69	84	101	111	18	29	314	105
Kwai Chung	8263	94.3	2	7	26	57	82	96	113	124	18	34	299	139

Pollutant: Respirable Suspended Particulates (Continuous monitoring)

Station	No. of hours	Data capture rate %	<----------Percentiles----------> 10	25	50	75	90	95	98	99	Geometric mean	Arithmetic mean	Highest 1 hour	Highest 24 hour
Kwun Tong	8207	93.7	23	34	51	72	99	117	137	163	49	53	289	182
Sha Tin	7936	90.6	17	27	42	66	95	113	136	155	41	46	281	168
Yuen Long	7963	90.9	20	30	48	81	117	143	176	199	48	54	292	176
Central / Western	8606	98.2	17	26	44	71	100	118	145	170	42	52	247	173
Tsuen Wan	7845	89.6	21	32	47	73	101	123	159	177	47	50	261	162
Kwai Chung	8549	97.6	17	25	38	61	89	107	136	154	39	46	242	143
Mong Kok	3814	43.5	37	51	67	87	110	133	163	186	66	62	280	164

Note: All pollutant units are in micrograms per cubic metre.

TABLE B4

Pollutant: Total Suspended Particulates (High Volume Sampling)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Kwun Tong	154	103	93	86	77	62	95	88	83	98	113	124	99
Sha Tin	105	65	56	54	56	34	34	52	44	78	93	155	69
Tai Po	123	71	65	62	60	35	37	47	65	108	82	136	77
Yuen Long	192	96	110	85	68	48	51	69	80	137	175	218	114
Sham Shui Po	133	87	93		77	64	88	84	75	104	144	165	101
Central / Western	150	95	84	72	68	33	36	48	66	109	125	148	87
Tsuen Wan	136	76	92	79	72	54	55	58	68	102	105	113	85
Kwai Chung	128	66	75	62	56	42	45	50	51	89	108	121	75
Mong Kok	181	114	142	123	115	102	152	156	98	157	155	198	142

Pollutant: Respirable Suspended Particulates (High Volume Sampling)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Kwun Tong	91	63	57	53	48	37	57	51	54	60	68	75	59
Sha Tin	66	44	41	42	39	18	20	31	29	54	59	107	46
Tai Po	76	48	49	50	43	23	24	31	45	74	52	93	52
Yuen Long	101	54	79	52	41	24	27	38	47	82	92	127	64
Sham Shui Po	85	57	60		49	32	46	46	49	58	73	92	59
Central / Western	82	55	56	48	44	21	22	30	41	66	65	93	52
Tsuen Wan	79	48	62	52	50	30	34	32	45	67	62	73	53
Kwai Chung	71	42	51	44	38	21	24	30	34	62	66	85	48
Mong Kok	98	63	75	68	66	54	74	76	57	88	83	111	77

Pollutant: Respirable Suspended Particulates (Continuous Monitoring)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Kwun Tong	79	62	53	53	61	32	40	46	48	67	62	82	53
Sha Tin	74	51	45	44	50	25	29	37	44	63	65	85	46
Yuen Long	93	64	54	51	57	26	36	38	48	68	73	104	54
Central / Western	78	60	51	50	55	22	27	31	42	61	65	86	52
Tsuen Wan	80	63	53	51	58	30	35	39	47	65	66	89	50
Kwai Chung	67	47	44	41	47	25	28	31	36	56	59	80	46
Mong Kok							71 *	64	64	78	75	81	62 *

Notes: *1. All units are in micrograms per cubic metre.*
2. Value with an '' is below the minimum data requirement for no. of data within the period.*
3. Shaded value is below the minimum data requirement for no. of data within a quarter.

TABLE B5 AIRBORNE SPECIES CONCENTRATIONS, DERIVED FROM TOTAL SUSPENDED PARTICULATES FOR 1996

Station	TSP	As	Be	Cd	Ni	Pb	Cr	Al	Mn	Fe	Ca	Mg	V	Zn	Ba	Cu	Hg	Na+	K+	Cl-	Br-	SO4=	C	THC	BAP	NH4+	NO3-
Kwun Tong	99	4.5	0.08	3.43	5.6	78	6.1	1038	38	1317	3539	921	7.5	198	35	85	0.19	5978	579	5085	23	17051	43407	2171	0.18	487	5986
Shatin	69	6.0	0.07	1.27	4.5	80	4.0	966	32	1255	2619	813	5.2	122	29	46	0.20	5130	690	3588	19	16659	33241	1255	0.12	698	5578
Tai Po	77	6.2	0.07	1.37	3.9	90	4.0	1018	33	1224	2715	833	4.8	143	29	67	0.20	4848	783	3344	22	16902	36290	1374	0.15	761	5666
Yuen Long	114	8.5	0.12	1.72	5.2	130	5.1	1459	47	1716	4419	897	6.4	223	33	102	0.20	4876	1084	3804	20	18123	49154	2283	0.29	987	7541
Sham Shui Po	101	5.2	0.09	1.43	6.1	83	5.4	1217	42	1482	3800	928	8.0	165	32	185	0.20	5730	664	4779	20	17698	43500	2213	0.15	548	5997
Central / Western	87	6.0	0.08	1.45	4.3	83	4.1	1103	38	1240	4000	1111	5.6	208	22	80	0.20	7574	789	8014	28	18830	37170	1476	0.09	555	6439
Tsuen Wan	85	5.2	0.07	1.31	5.0	82	4.4	942	34	1149	3248	828	6.5	165	28	81	0.20	5602	702	4603	22	17248	38385	1665	0.11	510	5826
Kwai Chung	75	5.9	0.07	1.61	6.1	89	5.1	1078	33	1130	3591	854	9.6	164	21	88	0.19	5409	745	4015	17	17573	34529	1252	0.09	575	6298
Mong Kok	142	5.7	0.09	1.64	8.1	93	18.0	1507	60	2372	5415	1107	7.3	228	45	75	0.20	6242	730	6224	27	18542	61763	5239	0.26	446	5926
Average	93	5.8	0.08	1.72	5.4	89	4.8	1150	40	1441	3722	924	6.8	180	31	90	0.20	5706	742	4848	22	17598	42222	2164	0.18	610	6115

Note: *1. All figures are in nanograms per cubic metre except TSP which is in micrograms per cubic metre.*
2. All values presented are arithmetic annual averages.

AIRBORNE SPECIES CONCENTRATIONS IN TOTAL SUSPENDED PARTICULATES EXPRESSED AS PERCENTAGE BY WEIGHT FOR 1996

Station	As	Be	Cd	Ni	Pb	Cr	Al	Mn	Fe	Ca	Mg	V	Zn	Ba	Cu	Hg	Na+	K+	Cl-	Br-	SO4=	C	THC	BAP	NH4+	NO3-
Kwun Tong	0.00	0.00	0.00	0.01	0.08	0.01	1.05	0.04	1.33	3.59	0.93	0.01	0.20	0.04	0.09	0.00	6.06	0.59	5.15	0.02	17.28	43.98	2.20	0.00	0.49	6.07
Shatin	0.01	0.00	0.00	0.01	0.12	0.01	1.39	0.05	1.81	3.78	1.17	0.01	0.18	0.04	0.07	0.00	7.40	1.00	5.18	0.03	24.04	47.97	1.81	0.00	1.01	8.05
Tai Po	0.01	0.00	0.00	0.01	0.12	0.01	1.33	0.04	1.60	3.55	1.09	0.01	0.19	0.04	0.09	0.00	6.33	1.02	4.37	0.03	22.07	47.39	1.79	0.00	0.99	7.40
Yuen Long	0.01	0.00	0.00	0.00	0.11	0.00	1.28	0.04	1.51	3.88	0.79	0.01	0.20	0.03	0.09	0.00	4.28	0.95	3.34	0.02	15.93	43.19	2.01	0.00	0.87	6.63
Sham Shui Po	0.01	0.00	0.00	0.01	0.08	0.01	1.20	0.04	1.47	3.76	0.92	0.01	0.16	0.03	0.18	0.00	5.67	0.66	4.73	0.02	17.51	43.04	2.19	0.00	0.54	5.93
Central / Western	0.01	0.00	0.00	0.00	0.09	0.00	1.26	0.04	1.42	4.58	1.27	0.01	0.24	0.03	0.09	0.00	8.68	0.90	9.18	0.03	21.58	42.60	1.69	0.00	0.64	7.38
Tsuen Wan	0.01	0.00	0.00	0.01	0.10	0.01	1.11	0.04	1.35	3.82	0.97	0.01	0.19	0.03	0.09	0.00	6.58	0.82	5.41	0.03	20.27	45.11	1.96	0.00	0.60	6.85
Kwai Chung	0.01	0.00	0.00	0.01	0.12	0.01	1.44	0.04	1.51	4.81	1.14	0.01	0.22	0.03	0.12	0.00	7.24	1.00	5.38	0.02	23.53	46.23	1.68	0.00	0.77	8.43
Mong Kok	0.00	0.00	0.00	0.01	0.07	0.01	1.06	0.04	1.67	3.81	0.78	0.01	0.16	0.03	0.05	0.00	4.39	0.51	4.37	0.02	13.03	43.41	3.68	0.00	0.31	4.17
Average	0.01	0.00	0.00	0.01	0.10	0.01	1.23	0.04	1.54	3.98	0.99	0.01	0.19	0.03	0.10	0.00	6.10	0.79	5.19	0.02	18.83	45.17	2.32	0.00	0.65	6.54

TABLE B6 AIRBORNE SPECIES CONCENTRATIONS, DERIVED FROM RESPIRABLE SUSPENDED PARTICULATES FOR 1996

Station	RSP	As	Be	Cd	Ni	Pb	Cr	Al	Mn	Fe	Ca	Mg	V	Zn	Ba	Cu	Hg	Na+	K+	Cl-	Br-	SO4=	C	THC	BAP	NH4+	NO3-
Kwun Tong	59	4.3	0.05	1.47	3.5	65	2.8	281	19	589	806	283	6.0	142	18	39	0.20	1796	573	1252	12	9483	31724	2213	0.19	2258	2891
Shatin	46	5.6	0.05	1.18	3.0	73	2.1	272	18	636	673	234	5.0	95	20	19	0.20	1347	676	702	11	9636	26520	1537	0.13	2510	2542
Tai Po	52	5.2	0.05	1.21	2.3	76	2.1	266	17	600	630	216	4.9	103	17	49	0.19	1258	738	864	13	9228	27496	1536	0.16	2558	2534
Yuen Long	64	7.1	0.06	1.59	3.1	111	2.5	403	22	674	1085	232	5.2	150	17	32	0.20	1185	1047	1051	13	9923	33925	2204	0.38	2961	4062
Sham Shui Po	59	4.8	0.05	1.23	4.4	69	2.7	318	20	589	891	277	6.9	114	14	43	0.20	1695	633	1144	12	9394	31039	2314	0.16	2190	2896
Central / Western	52	5.1	0.05	1.29	2.9	70	2.1	328	21	546	944	345	5.0	152	12	35	0.20	2247	689	2157	14	9832	26217	1762	0.12	2375	3424
Tsuen Wan	53	4.5	0.05	1.15	3.5	72	2.1	269	22	495	780	264	6.2	120	13	22	0.20	1664	689	1081	12	9522	29036	1984	0.15	2307	2914
Kwai Chung	48	5.3	0.05	1.40	3.7	76	2.3	302	18	492	815	243	8.1	120	11	20	0.19	1452	709	924	11	9884	25346	1489	0.12	2451	2868
Mong Kok	77	5.1	0.06	1.49	4.8	77	8.2	380	30	834	1249	354	6.7	144	22	40	0.19	1958	709	1795	13	9985	42441	4358	0.30	2332	3310
Average	56	5.2	0.05	1.32	3.4	76	2.3	310	21	603	868	271	6.0	125	16	34	0.20	1619	710	1215	12	9610	30440	2178	0.21	2425	3024

Note: *1. All figures are in nanograms per cubic metre except RSP which is in micrograms per cubic metre.*
2. All values presented are arithmetic annual averages.

AIRBORNE SPECIES CONCENTRATIONS IN RESPIRABLE SUSPENDED PARTICULATES EXPRESSED AS PERCENTAGE BY WEIGHT FOR 1996

Station	As	Be	Cd	Ni	Pb	Cr	Al	Mn	Fe	Ca	Mg	V	Zn	Ba	Cu	Hg	Na+	K+	Cl-	Br-	SO4=	C	THC	BAP	NH4+	NO3-
Kwun Tong	0.01	0.00	0.00	0.01	0.11	0.00	0.47	0.03	0.99	1.36	0.48	0.01	0.24	0.03	0.07	0.00	3.03	0.97	2.11	0.02	16.00	53.54	3.74	0.00	3.81	4.88
Shatin	0.01	0.00	0.00	0.01	0.16	0.00	0.59	0.04	1.37	1.45	0.51	0.01	0.20	0.04	0.04	0.00	2.91	1.46	1.52	0.02	20.81	57.28	3.32	0.00	5.42	5.49
Tai Po	0.01	0.00	0.00	0.00	0.15	0.00	0.51	0.03	1.15	1.21	0.41	0.01	0.20	0.03	0.09	0.00	2.41	1.42	1.66	0.03	17.70	52.73	2.95	0.00	4.90	4.86
Yuen Long	0.01	0.00	0.00	0.00	0.17	0.00	0.62	0.03	1.05	1.68	0.36	0.01	0.23	0.03	0.05	0.00	1.84	1.62	1.63	0.02	15.39	52.61	3.42	0.00	4.59	6.30
Sham Shui Po	0.01	0.00	0.00	0.01	0.12	0.00	0.54	0.03	1.00	1.51	0.47	0.01	0.19	0.02	0.07	0.00	2.88	1.08	1.94	0.02	15.97	52.77	3.93	0.00	3.72	4.92
Central / Western	0.01	0.00	0.00	0.01	0.13	0.00	0.63	0.04	1.04	1.81	0.66	0.01	0.29	0.02	0.07	0.00	4.30	1.32	4.13	0.03	18.80	50.14	3.37	0.00	4.54	6.55
Tsuen Wan	0.01	0.00	0.00	0.01	0.13	0.00	0.50	0.04	0.93	1.46	0.50	0.01	0.23	0.02	0.04	0.00	3.12	1.29	2.03	0.02	17.85	54.43	3.72	0.00	4.32	5.46
Kwai Chung	0.01	0.00	0.00	0.01	0.16	0.00	0.63	0.04	1.03	1.70	0.51	0.02	0.25	0.02	0.04	0.00	3.04	1.48	1.93	0.02	20.67	53.00	3.11	0.00	5.12	6.00
Mong Kok	0.01	0.00	0.00	0.01	0.10	0.01	0.49	0.04	1.09	1.63	0.46	0.01	0.19	0.03	0.05	0.00	2.55	0.92	2.34	0.02	13.01	55.31	5.68	0.00	3.04	4.31
Average	0.01	0.00	0.00	0.01	0.13	0.00	0.55	0.04	1.07	1.54	0.48	0.01	0.22	0.03	0.06	0.00	2.87	1.26	2.15	0.02	17.04	53.99	3.86	0.00	4.30	5.36

TABLE B7 TOTAL WET AND DRY DEPOSITION FOR 1996

(a) WET DEPOSITION

	Monitoring Station	Kwun Tong	Central / Western
	WET DEPOSITION (ton/ha)	18030	17216
	WEIGHTED MEAN pH (based on volume-weighted mean hydrogen ion concentrations ($[H^+]$)	4.68	4.68
	WEIGHTED MEAN pH (based on volume-weighted mean pH)	4.85	4.84
	NO. OF SAMPLES	22	21
Filtrate (kg/ha)	NH_4^+	6.01	4.46
	NO_3^-	12.19	9.52
	$SO_4^=$	33.53	29.42
	Cl^-	25.24	27.56
	Na^+	14.60	15.34
	K^+	4.73	4.48
	Formate	3.63	3.44
	Acetate	3.61	3.44
	Ca	3.31	3.71
	Mg	1.48	1.51
Residue (kg/ha)	WEIGHT	81.94	68.33
	Si	4.21	2.25
	Al	1.39	0.95
	Ca	0.15	0.12
	Fe	0.64	0.34
	Mg	0.15	0.15
	V	0.08	0.08
	Mn	0.07	0.07
	Cu	0.33	0.05
	Ba	0.18	0.17

(b) DRY DEPOSITION

	Monitoring Station	Kwun Tong	Central / Western
	NO. OF SAMPLES	44	42
Filtrate (kg/ha)	NH_4^+	0.48	0.27
	NO_3^-	5.87	4.72
	$SO_4^=$	13.95	10.63
	Cl^-	12.23	14.59
	Na^+	7.01	8.34
	K^+	0.93	0.71
	Formate	0.40	0.38
	Acetate	0.38	0.40
	Ca	8.70	7.35
	Mg	0.92	0.94
Residue (kg/ha)	WEIGHT	189.00	87.14
	Si	28.72	15.32
	Al	11.65	6.13
	Ca	3.68	2.36
	Fe	4.38	2.65
	Mg	0.49	0.37
	V	0.01	0.01
	Mn	0.12	0.06
	Cu	0.48	0.01
	Ba	0.06	0.04

** Note: The weighted mean pH is calculated from the pH value measured by the Gov't Lab.*

TABLE B8 VARIATION OF AIR POLLUTANT CONCENTRATIONS

Pollutant: Sulphur Dioxide

Station	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h
Kwun Tong		12	9	8	7	8	13	20	26	27	26	26	26	25	26	27	27	26	24	21	18	17	17	15
Sha Tin		9	8	7	6	7	9	13	14	14	15	15	14	14	15	15	17	18	19	19	17	16	15	13
Yuen Long		13	12	12	11	12	14	18	22	23	24	22	21	21	22	22	22	22	22	21	20	19	18	17
Sham Shui Po		13	12	11	10	12	15	20	23	24	23	23	23	23	25	26	27	26	25	24	21	19	18	16
Central / Western		10	9	9	9	10	11	14	17	20	21	20	19	19	20	21	20	20	18	17	16	14	13	12
Tsuen Wan		13	11	11	11	12	15	21	26	29	27	27	26	27	28	30	31	31	30	26	23	21	19	18
Kwai Chung		14	13	12	13	13	14	17	23	25	24	26	24	25	26	28	30	30	29	26	22	19	17	17
Mong Kok		17	16	15	15	16	18	25	39	49	52	48	40	45	47	41	42	36	31	27	25	23	22	21

Pollutant: Nitrogen Oxides

Station	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h
Kwun Tong			52	43	40	58	149	249	280	261	224	199	182	182	197	211	233	259	275	247	197	188	191	183
Sha Tin			58	49	44	49	87	138	138	102	81	70	58	57	61	68	83	102	126	140	143	144	146	132
Tai Po			50	41	41	50	89	143	137	103	80	68	65	62	64	69	80	97	116	126	123	119	122	115
Yuen Long			63	53	49	60	103	144	134	112	97	85	80	81	86	93	107	120	137	146	139	137	137	130
Sham Shui Po	116	85	69	60	57	66	115	188	211	194	170	155	142	147	158	165	177	195	203	190	167	159	157	155
Central / Western			48	44	42	42	51	88	125	139	122	107	90	90	95	98	104	113	118	117	101	91	88	85
Tsuen Wan			47	38	38	50	111	179	204	193	164	149	139	140	151	154	169	189	207	187	156	152	150	138
Kwai Chung			33	28	27	30	50	82	102	99	87	84	76	79	87	90	99	107	124	116	100	89	82	75
Mong Kok			116	105	97	108	173	295	395	413	380	334	284	313	354	335	347	359	350	302	260	256	259	248

Pollutant: Nitric Oxide

Station	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h
Kwun Tong			14	11	10	16	61	119	136	123	100	84	73	71	78	84	95	110	121	107	80	76	80	76
Sha Tin			19	15	12	13	30	58	57	35	24	19	14	13	14	14	18	26	40	50	54	57	60	54
Tai Po			14	10	10	13	32	61	56	37	24	18	16	14	14	15	18	24	33	41	42	42	45	43
Yuen Long			18	13	12	17	39	61	53	38	29	23	20	20	20	22	27	32	42	49	48	49	52	50
Sham Shui Po	33	27	21	17	16	19	40	79	90	79	64	54	45	46	50	51	57	67	73	67	57	55	56	57
Central / Western			12	11	10	10	14	30	49	55	43	33	24	22	23	24	26	31	34	35	29	24	24	24
Tsuen Wan			10	7	7	11	40	77	91	83	65	55	48	47	50	50	57	68	79	71	55	54	55	50
Kwai Chung			7	6	6	6	12	26	36	34	28	26	21	20	22	21	25	27	34	33	28	24	23	21
Mong Kok			43	39	34	40	76	146	202	210	188	158	128	143	165	152	160	168	166	140	116	116	119	114

Pollutant: Nitrogen Dioxide

Station	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h
Kwun Tong			30	26	25	33	55	68	72	72	72	71	71	72	79	83	87	90	91	84	74	71	69	66
Sha Tin			29	26	25	29	41	50	52	48	44	41	37	37	40	46	55	62	65	64	60	57	54	50
Tai Po			29	26	27	30	40	50	51	47	43	41	41	40	42	46	52	61	65	64	59	55	53	48
Yuen Long			36	32	31	34	42	50	53	54	53	50	50	51	55	60	66	71	73	70	65	61	58	54
Sham Shui Po	67	43	38	34	33	37	54	69	74	74	73	73	73	77	83	87	90	93	93	88	81	76	72	69
Central / Western			29	27	26	26	31	42	51	56	56	57	54	56	60	61	64	67	66	64	58	53	51	48
Tsuen Wan			32	27	27	33	50	61	65	66	64	64	65	68	74	77	81	85	85	79	72	68	66	62
Kwai Chung			22	20	19	21	31	42	47	47	45	45	45	48	54	58	62	66	71	65	57	51	47	43
Mong Kok			50	46	44	46	57	72	86	92	93	92	88	94	102	102	103	103	97	89	83	79	77	74

Pollutant: Carbon Monoxide

Station	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h
Kwai Chung	630	440	420	410	410	420	450	500	550	550	520	500	480	470	490	490	520	510	580	600	600	570	550	520
Mong Kok	880	770	720	670	630	700	780	1030	1250	1280	1220	1180	1110	1140	1300	1300	1310	1460	1620	1450	1270	1270	1230	1140

Pollutant: Ozone

Station	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h
Yuen Long	15	15	18	19	18	16	11	10	12	17	25	36	44	47	46	40	31	21	14	11	10	10	10	10
Central / Western	40	38	40	41	41	39	32	21	18	20	25	32	40	42	41	39	32	25	20	19	22	23	22	23
Kwai Chung	44	42	44	45	45	42	32	25	25	30	37	44	48	50	49	45	37	29	20	20	24	26	26	28

Pollutant: Respirable Suspended Particulates (Continuous Monitoring)

Station	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h
Kwun Tong	48	42	39	38	38	40	49	59	65	67	65	63	59	63	65	67	68	70	71	68	61	56	54	51
Sha Tin	46	43	42	41	41	42	47	53	54	52	51	49	48	48	48	52	56	58	59	60	60	58	54	50
Yuen Long	51	48	47	46	46	49	55	63	64	65	64	62	62	63	66	68	69	71	71	71	68	63	59	56
Central / Western	43	40	39	39	39	41	43	50	59	65	62	60	56	60	62	62	62	62	62	61	56	51	47	45
Tsuen Wan	45	42	41	39	41	42	48	55	59	58	57	58	57	61	66	69	70	71	73	71	63	56	52	49
Kwai Chung	40	38	38	37	37	39	41	44	48	51	52	51	49	51	55	56	56	55	55	54	51	47	44	42
Mong Kok	56	50	48	46	45	47	53	66	81	89	90	86	78	89	93	87	92	90	85	84	78	71	66	61

Note: All units are in micrograms per cubic metre.