

# Atmospheric Particulate Lead Levels in the Maltese Islands.

Final Report 18 October – 1 November 2004

Presented to the  
Malta Environment and Planning Authority.

MEPA appointed Dr George Peplow to conduct a monitoring project to measure the levels of lead in air-borne particulate matter. The monitoring project was conducted during the period 18 October to 1 November 2004.

Samples of air were collected during daytime, from the main roads of several towns and villages throughout Malta and Gozo. The selected towns were those found to have relatively high levels of lead during the first monitoring exercise carried out in 2002/3. The sampling equipment was set up at front windows of local commercial banks, council offices, police stations and private residences. A single sample was collected from each town. Sampling was based on the standard method referred in EU Directive 82/884/EEC, using appropriate air sampling equipment to collect particles on membrane filters. Laboratory measurements on the membrane filters were carried out on the at an accredited laboratory in Italy.

The results obtained from the survey indicated that:

- a) The overall **mean concentration of lead** in atmospheric particles in the sampled towns during the period of October 2004 was **0.121  $\mu\text{g}/\text{Nm}^3$** .
- b) EU Directive 1999/30/EC lists the maximum level of atmospheric particulate lead concentration at  $0.5 \mu\text{g}/\text{Nm}^3$ . **No sampling site was found to exceed the EU level of  $0.5 \mu\text{g}/\text{Nm}^3$ .**
- c) Two towns, **Zabbar and Naxxar** were found to have lead levels that **exceeded the Lower Target Assessment Threshold** of  $0.25 \mu\text{g}/\text{Nm}^3$ .
- d) There has been a **marked reduction of air-borne lead particulate** concentration in all the towns except Zabbar, over the past 20 months.

Table 1 shows all the results obtained for samples collected from the respective points during the period 18 October to 1 November 2004. Sampling was carried out for a period varying between 4 – 8 hours at a flow rate of about 15 litres per minute at ambient temperature. Particulate matter was retained on a  $0.45 \mu\text{m}$  membrane filter. Sampling was effected during weekdays from police stations, local councils, commercial banks and private houses. The analysis of the membrane samples was carried out at CEFIT Srl, a private, fully accredited (ISO 17025) laboratory in Italy. CEFIT evaluated the atmospheric particulate lead results to the lead concentrations at normalised volumes of air, as  $\mu\text{g}/\text{Nm}^3$ . Standard analytical methods were carried out for the determination of lead present in the retained particulate matter.

**The overall mean concentration of lead in atmospheric particles in the sampled towns during the period 18 October and 1 November 2004 was  $0.121 \mu\text{g}/\text{Nm}^3$ .** EU Directive 96/62/EC Article 6, envisages limit values to be set: namely, that the Upper Target Assessment Threshold and the Lower Alert Assessment Threshold have to be established. Most EU countries have adopted the following criteria for establishing the limits:

Limit Value	Set by Directive 99/30/EC: <b><math>0.5 \mu\text{g}/\text{Nm}^3</math></b>
Upper Target Assessment Threshold	70 % of the $0.5 \mu\text{g}/\text{Nm}^3$ limit: <b><math>0.35 \mu\text{g}/\text{Nm}^3</math></b>
Lower Alert Assessment Threshold	50 % of the $0.5 \mu\text{g}/\text{Nm}^3$ limit: <b><math>0.25 \mu\text{g}/\text{Nm}^3</math></b>

**Table 1. Atmospheric particulate lead concentrations during the period 18 October 2004 to 1 November 2004.**

Town	Premises	Street	Date	Sampled Volume nornzd	Lead as Pb $\mu\text{g}/\text{Nm}^3$
Paola	PS	Valletta Road	18-Oct-04	2880	<b>0.052</b>
Marsa	BOV	Cross Road	18-Oct-04	3631	<b>0.083</b>
Senglea	PS	4 Sept. Avenue	19-Oct-04	3603	<b>0.056</b>
Bormla	PS	St Paul Square	19-Oct-04	3265	<b>0.092</b>
Zabbar	BOV	Sanctuary Street	20-Oct-04	3396	<b>0.294</b>
Fgura	PS	Hompesch Rd	20-Oct-04	1021	<b>0.098</b>
Qormi	HSBC	38 St. Sebastian Str	21-Oct-04	3396	<b>0.118</b>
Zebbug	HSBC	254 Main Str	21-Oct-04	1893	<b>0.158</b>
Blata L Bajda	MUSEUM	Blata L Bajda	22-Oct-04	3419	<b>0.161</b>
Pieta	J Spiteri	Marina Street	22-Oct-04	2781	<b>0.216</b>
Iklin	Private Residence	Geranimo Abos	23-Oct-04	3530	<b>0.099</b>
Msida	PS	Rue D' Argens	01-Nov-04	3625	<b>0.11</b>
Gzira	BOV	219 Marina Street	01-Nov-04	3349	<b>0.105</b>
Sliema	PS	Manwel Dimech Street	26-Oct-04	3726	<b>0.054</b>
Paceville	Wembley Garage	St Georges Road	26-Oct-04	3108	<b>0.129</b>
san giljan	PS	st georges road	27-Oct-04	3666	<b>0.055</b>
Pembroke	Kunsill Lokali	Pembroke	27-Oct-04	3460	<b>0.101</b>
Tal Ibragg	BOV	Tal Ibragg Road	28-Oct-04	3713	<b>0.175</b>
Naxxar	BOV	Labour Ave	28-Oct-04	3343	<b>0.254</b>
Victoria (G)	PS	It Tokk	30-Oct-04	3432	<b>0.102</b>
Fontana (G)	private resid.	Xlendi Road	30-Oct-04	3667	<b>0.027</b>

Tables 2 to 4 show the measured results with respect to the Lower Assessment Threshold (LAT) of 0.250  $\mu\text{g}/\text{Nm}^3$ . The towns of Zabbar and Naxxar were the towns with the higher level of lead particulates which exceeded the LAT. Two other towns, Pieta and Tal-Ibragg had levels which approached the LAT. About 80% of the towns sampled had lead levels which were quite below the LAT.

**Table 2: Towns where the levels have been found to exceed the Lower Target Assessment Threshold of 0.25  $\mu\text{g}/\text{Nm}^3$ .**

<b>Zabbar</b>	<b>0.294</b>
<b>Naxxar</b>	<b>0.254</b>

**Table 3: Towns where the levels have been found to be close to the Lower Target Assessment Threshold of 0.25  $\mu\text{g}/\text{Nm}^3$ .**

<b>Pieta</b>	<b>0.216</b>
<b>Tal Ibragg</b>	<b>0.175</b>

**Table 4: Towns where the levels have been found to be reasonably lower than the Lower Target Assessment Threshold of 0.25  $\mu\text{g}/\text{Nm}^3$ .**

<b>Blata L Bajda</b>	<b>0.161</b>
<b>Zebbug</b>	<b>0.158</b>
<b>Paceville</b>	<b>0.129</b>
<b>Qormi</b>	<b>0.118</b>
<b>Msida</b>	<b>0.110</b>
<b>Gzira</b>	<b>0.105</b>
<b>Victoria (G)</b>	<b>0.102</b>
<b>Pembroke</b>	<b>0.101</b>
<b>Iklin</b>	<b>0.099</b>
<b>Fgura</b>	<b>0.098</b>
<b>Bormla</b>	<b>0.092</b>
<b>Marsa</b>	<b>0.083</b>
<b>Senglea</b>	<b>0.056</b>
<b>san giljan</b>	<b>0.055</b>
<b>Sliema</b>	<b>0.054</b>
<b>Paola</b>	<b>0.052</b>
<b>Fontana (G)</b>	<b>0.027</b>

Table 5 gives the comparative reduction in lead levels from 2002/3 to October 2004. Most of the towns experienced a marked reduction in lead levels. Zabbar was the only town where an increase of 3 % was recorded.

**Table 5: The comparative levels measured during 2004 with the mean levels measured during 2002/03.**

	Mean Levels in 2002/03	Levels in 2004	Reductions in %
Fontana (G)	0.586	0.027	-95
Senglea	0.403	0.056	-86
Paola	0.292	0.052	-82
San Giljan	0.306	0.055	-82
Sliema	0.246	0.054	-78
Blata L Bajda	0.617	0.161	-74
Fgura	0.359	0.098	-73
Marsa	0.269	0.083	-69
Pembroke	0.322	0.101	-69
Victoria (G)	0.300	0.102	-66
Gzira	0.292	0.105	-64
Bormla	0.249	0.092	-63
Msida	0.295	0.110	-63
Iklin	0.247	0.099	-60
Qormi	0.278	0.118	-58
Paceville	0.265	0.129	-51
Naxxar	0.481	0.254	-47
Tal Ibragg	0.330	0.175	-47
Zebbug	0.262	0.158	-40
Pieta	0.288	0.216	-25
Zabbar	0.286	0.294	3

Chart 1 shows the relative distribution of the atmospheric lead particulate levels in the towns sampled.

Lead levels in Towns

