



## CHANDIGARH STATISTICS



### BUSES IN CHANDIGARH

FEB 2008

Bus Stand	Buses	Trips	Remarks
Sector 17	1000	1068	Long Route (Including Others)
Sector 17	134	202	Long Route CTU
Sector 17	191	1487	Local Bus Stand CTU
Sector 43	802	815	Long Route (Including Others)
Sector 43	47	60	Long Route CTU
Sector 43	74	638	Local Bus Stand CTU



Source: General Manager T&S, CTU

## AIR POLLUTION

Air pollution is the modification of the natural characteristics of the atmosphere by chemicals, particulate matter, or biological agent or introduction of contaminants into the atmosphere that cause harm to all living beings including humans and the environment.

Pollutants are substances which directly or indirectly damage us and our environment. Pollutants can be naturally occurring or anthropogenic but are considered contaminants when in excess of natural levels. There are many substances in the air which may impair the health of plants and animals (including humans), or reduce visibility.

Primary pollutants are the substances directly emitted from a process, such as SO<sub>2</sub>, CO, NO, NO<sub>2</sub>, CO<sub>2</sub> etc. are released by burning of fossil fuels and ash from a volcanic eruption.

Secondary pollutants are not emitted directly. They are formed in the air when primary pollutants react or interact. An important example of a secondary pollutant is ground level ozone present in Troposphere - one of the many secondary pollutants that make up photochemical smog. Some pollutants may be both primary and secondary.

Vehicular  
Pollution



Firecrackers



Burning  
Leaves



Industries



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**AIR QUALITY OF CHANDIGARH (Annual Average)**

Zone	Sector 17				Industrial - Area				Punjab Engineering College				Govt. College for Girls, Sector 42 From Oct 2005 IMTECH Sector 39				Kaimbwala Village			
	RS PM	SPM	SO <sub>2</sub>	NO <sub>x</sub>	RS PM	SPM	SO <sub>2</sub>	NO <sub>x</sub>	RS PM	SPM	SO <sub>2</sub>	NO <sub>x</sub>	RS PM	SPM	SO <sub>2</sub>	NO <sub>x</sub>	RS PM	SPM	SO <sub>2</sub>	NO <sub>x</sub>
Permissible Limit	60	140	60	60	120	360	80	80	60	140	60	60	60	60	140	60	60	140	60	60
1993	-	223	10	29	-	250	14	35	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	154	03	29	-	201	12	28	-	-	-	-	-	-	-	-	-	-	-	-
1995	-	153	10	28	-	271	12	35	-	-	-	-	-	-	-	-	-	-	-	-
1996	-	135	06	16	-	209	08	26	-	-	-	-	-	-	-	-	-	-	-	-
1997	-	226	4.5	4.2	-	255	5.9	4.9	-	-	-	-	-	-	-	-	-	-	-	-
1998	-	236	4.9	8.5	-	320	5.6	9.0	-	-	-	-	-	-	-	-	-	-	-	-
1999	-	263	6.0	13.3	-	422	6.2	16.9	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	265	5.7	11	-	424	6.4	9.8	-	-	-	-	-	-	-	-	-	-	-	-
2001	-	296	7.0	11	-	460	6.0	10.0	-	-	-	-	-	-	-	-	-	-	-	-
2002	-	276	7.0	10	-	401	9.0	11.0	-	-	-	-	-	-	-	-	-	-	-	-
2003	-	212	3.0	27	-	331	4.0	30.0	-	-	-	-	-	-	-	-	-	-	-	-
2004	111	254	5.0	25.0	136	364	6.0	34.0	69	137	6.0	23.0	-	-	-	-	-	-	-	-
2005	92	215	3	16	147	430	3.0	20.0	74	186	2.0	13	102	234	2	15	80	198	2	11
2006	87	185	2	12	141	306	2	17	94	191	2	10	103	227	2	11	99	217	2	8
2007	88	192	2	16	132	286	2	21	93	197	2	13	99	210	2	14	100	216	2	11

\* ALL VALUES ARE IN MICROGRAM PER CUBIC METER µg/m<sup>3</sup>

Chandigarh Pollution Control Committee

## MAJOR AIR POLLUTANTS

### Particulate Matter

Particulate is the term given to the minute particles of solid or semi solid material dispersed in the atmosphere visible as a 'Brown Cloud', haze or smog. Particulates that range in size from less than 0.1 micrometre ( $\mu\text{m}$ ) up to approximately 100  $\mu\text{m}$  are designated as dust or 'Total Suspended Particulates'. Particulates larger than that range tends to settle as dust.

### Sulphur Dioxide

Sulphur dioxide ( $\text{SO}_2$ ) is a colourless gas readily soluble in water. Natural sources includes sulphur bacterial activities, volcanoes, forest fires etc. Man made contributions include the use of sulphur containing fossil fuels for transportation, domestic purposes and power generation.

### Nitrogen Dioxide

Oxides of nitrogen are released in all the types of combustion as they are formed by the oxidation of atmospheric nitrogen at high temperature. Nitric oxide usually emitted from the automobile exhaust is oxidized to nitrogen dioxide ( $\text{NO}_2$ ). Nitrogen dioxide is the predecessor of gaseous nitric acid and nitrate aerosols, which has the biggest health impact. The major sources of  $\text{NO}_2$  are combustion-associated processes. Oxides of nitrogen particularly nitrogen dioxide are toxic gases.

### Carbon Monoxide

Carbon monoxide ( $\text{CO}$ ) is a colourless, odourless and tasteless gas with relatively poor solubility in water. Anthropogenic emissions of  $\text{CO}$  originate primarily from incomplete combustion of carbonaceous materials. The largest carbon monoxide emissions are produced as exhaust of internal combustion engines, especially of vehicles with petrol engines.

### Ozone

Ozone ( $\text{O}_3$ ) is a gas formed when three atoms of oxygen are combined. It is not emitted directly into the air, but is created by a chemical reaction between oxides of nitrogen ( $\text{NO}_x$ ) and volatile organic compounds ( $\text{VOC}$ ) in the presence of sunlight. Ozone has the same chemical structure at stratosphere or at troposphere (ground level) and can be beneficial or harmful, depending on its location. The ground level ozone is an air pollutant. The stratospheric ozone layer protects life on earth from sun's harmful ultraviolet rays ( $\text{UV-b}$ ).

### Toxic or Hazardous Air Pollutants (HAP)

In recent years, toxic air pollutants may exist as particulate matter or aerosols. Examples of gaseous toxic air pollutants include benzene, toluene and xylene (BTX) which are found in gasoline. Air toxics typically associated with particulate matter include heavy metals such as chromium, cadmium, mercury and lead compounds; polycyclic aromatic hydrocarbons (PAHs), which are generally emitted from the combustion of wastes and fossil fuels.

## SOURCES OF AIR POLLUTION

These are of two types- Natural and Anthropogenic

### Natural Air Pollutants:

- ☹ Dust from natural sources, such as open lands
- ☹ Methane, emitted by the digestion of food by animals, for example cattle
- ☹ Radon gas from radioactive decay within the Earth's crust etc.

### Anthropogenic sources:

- ☹ "Stationary Sources" as smoke stacks of power plants, municipal waste incinerators
- ☹ "Mobile Sources" as motor vehicles, aircraft etc.
- ☹ Controlled burn practices used in agriculture and forestry management.

**AIR QUALITY OF CHANDIGARH DURING DIWALI FESTIVAL**

Year	Location	Parameter g/m <sup>3</sup> (24 hrly avg.)	2003		2004		2005		2006		2007	
			Before Diwali Day	Diwali Day	Before Diwali Day	Diwali Day	Before Diwali Day	Diwali Day	Before Diwali Day	Diwali Day	Before Diwali Day	Diwali Day
Sector 22	SPM	-	642	400	286	400	278	614	189	278	207	256
	RSPM	-	-	-	-	107	194	80	160	77	138	
	SO <sub>2</sub>	-	20	4.5	9.5	2	8	2	2	2	2	2
	NOx	-	28	15.2	21	9	12	14	15	23	25	
Village ? Kaimbwala	SPM	287	462	416	342	416	207	230	141	171	131	173
	RSPM	-	-	-	-	88	109	52	71	35	76	
	SO <sub>2</sub>	22	24	23.6	25	2	4	2	2	2	2	2
	NOx	18	33	19.6	22.3	10	11	17	18	13	7	
Punjab University	SPM	205	311	272	199	224	335	121	300	228	342	
	RSPM	-	-	-	-	90	133	60	165	-	-	
	SO <sub>2</sub>	4.5	8.9	4.1	8.2	2	3	2	2	5	8	
	NOx	14.5	21.7	15.4	19.1	9	11	12	24	16	21	
Sector 29	SPM	286	363	375	220	348	424	214	325	293	477	
	RSPM	-	-	-	-	93	186	85	181	121	282	
	SO <sub>2</sub>	4.4	8.7	24.6	25	2	7	2	2	2	2	
	NOx	14.6	21.3	21.3	21	10	14	21	23	21	23	
Village Kajheri	SPM	248	342	334	239	313	508	230	417	272	464	
	RSPM	-	-	-	-	-	-	-	-	-	-	
	SO <sub>2</sub>	4.1	12.6	11.6	4.1	7	11	4	7	5	9	
	NOx	13.9	21.4	19.2	13.2	10	15	17	21	17	23	
Manimajra	SPM	445	588	570	508	273	496	258	424	258	439	
	RSPM	-	-	-	-	-	-	-	-	-	-	
	SO <sub>2</sub>	19	28	28.6	28	6	12	4.5	8	5	9	
	NOx	23	42	22.3	24	13	18	18	22	17	23	
Sector 9	SPM	295	345	326	270	237	332	211	267	215	319	
	RSPM	-	-	-	-	-	-	-	-	-	-	
	SO <sub>2</sub>	4.6	9.6	8.8	4.8	5	10	5	8.5	5	11	
	NOx	14.4	21.3	20.8	15.5	11	16	16	18	7	14	

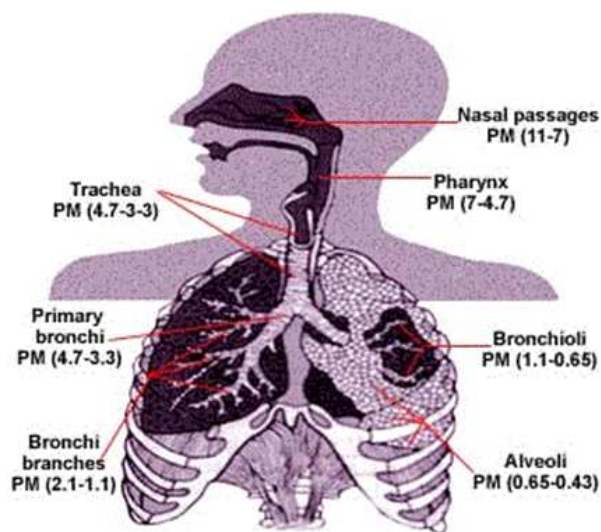
STANDARD VALUE : Day time (6 AM to 10 PM) = 55 dB(A) Night time (10 PM to 6 AM) = 45 dB(A)

Chandigarh Pollution Control Committee

Additional Town Hall Building,  
Sector 17-C, Chandigarh

**AIR POLLUTION BY RESPIRATION**

The human nostrils filter out 99% of the inhaled large and medium sized particles. The rest may enter the windpipe and lungs. Some of the smallest particles, called respirable particulates may tend to be deposited in the alveoli (tiny air sacs in the lungs). In the lungs, particulates slow down the exchange of oxygen with carbon dioxide in the blood, causing shortness of breath. Usually, people most sensitive to these conditions have respiratory diseases like emphysema, bronchitis, asthma or heart problems. Particles themselves may be poisonous if inhaled, damaging remote organs like the kidneys or liver. Swallowed mucous that is laden with hazardous particulate matter may damage the stomach.



Disposition of Particulate Matter (PM in micrometer) in the Respiratory system

**EFFECTS OF AIR POLLUTION**

**III Effects of Ambient Air Particulates**

Respiratory Symptoms like stuffy or runny nose, sinusitis, sore throat, wet cough, hay fever and burning or red eyes, Bronchitis, Pneumoconiosis, Cancer etc.

**III Effects of NOx**

Chronic lung diseases, effects on immune system and host defence, respiratory morbidity in children

**III Effects of CO**

Inhaled CO has no direct toxic affects on lungs but exert its effects by interfering with oxygen transport through the formation of carboxy-haemoglobin (COHb). It reduces the oxygen carrying capacity of the blood and impair the release of oxygen from haemoglobin.

**III Effects of Ozone**

Repeated exposure to ozone pollution may cause permanent damage to the lungs, including chest pain, coughing, nausea, throat irritation and congestion. It also worsens bronchitis, heart disease, emphysema, asthma and reduces lung capacity. Ozone can aggravate asthma, when ambient ozone levels are high.

**III Effects of Toxic Air Pollutants**

**Lead:** Damage to Kidney, Liver and Nervous System.

**Benzene:** Short-term exposure causes depression of the central nervous system where as Long term exposure reduces the number of circulating red blood cells (erythrocytes), white blood cells (leukocytes) and clotting cells (thrombocytes).

www.cpcb.nic.in

**VEHICLES' REGISTRATION STATISTIC IN CHANDIGARH**

Type of Vehicle	2003	2004	2005	2006
Cars, Jeeps and Summos etc.	8471	9555	10265	12893
Motor Cycles, Scooters and Moped	17025	17241	19216	20649
Auto Rickshaws/Three Wheeler	101	96	86	75
Buses	24	57	93	102
Goods Vehicles etc.	42	25	34	44
Tractors	4	5	3	14
Number of Household	218181	266007	280407	295998
Per Capita Vehicles (Per Household)	2	2	2	2

\*Total vehicles (Two Wheelers And Four Wheelers Excluding Commercial Vehicles) till 2006= 626868

Statistical Abstract Chandigarh-2003,2005,2006



### ENVIRONMENT THROUGH OUR EYES

Galloping increase in the number of motorised vehicles in Chandigarh is a matter of concern and is responsible for the increase in air pollution in the city. A two pronged strategy is required to overcome this problem. We have to reduce generation of pollution at the source by minimizing the use of motorised vehicles and promoting cycles in the city. The administration has constructed cycle tracks along all major roads of the city. To combat air pollution particularly caused by vehicles, the administration is planting one million trees during 2008 and appeal every individual to plant at least one sapling and nurture it.

*Ishwar Singh, Director Environment & DCF, Chandigarh*

### CHANDIGARH POLLUTION CONTROL COMMITTEE

Chandigarh Administration is committed to provide a pollution free environment to the residents of Chandigarh. A number of steps have been taken to control air pollution in the city. The main source of air pollution is from the ever increasing number of vehicles. In order to reduce the number of diesel operating vehicles in Chandigarh, the process to introduce alternate fuels like LPG, CNG has been initiated. All the hospitals have installed air pollution control device on the incinerator. Administration is also encouraging battery operated vehicles in the city by providing capital subsidy and ten battery operated buses would be deployed in the intra sector roads. Administration has also issued directions to the Municipal Corporation and Chief Engineer to ensure that no dry leaves and garbage is burnt. The Green action plan is being implemented in the city so that the air pollution is absorbed by the trees. An awareness campaign has also been launched through the Eco-Clubs of schools and other educational institutions.

*PJS Dadhwal, Member Secretary, CPCC, Chandigarh*

### VEHICULAR POLLUTION CAN BE CONTROLLED

Vehicles do not pollute at their own but people make them so. For example if only the most harmful of the exhaust emissions that is particulate emission is considered, the carcinogenic effect of one new diesel car is equivalent to 24 petrol cars and 84 new CNG cars on the road. With a little of extra care we may not only save the energy but can enjoy eco friendly rides. Getting of vehicles serviced on time and choosing public transportation system or sharing basis transportation may control the vehicular pollution to great extent. Find below some tips for safe and eco friendly drive:

[www.cpcb.nic.in](http://www.cpcb.nic.in)

1. Drive between 45-55 kmph
2. Keep your engine healthy
3. Drive in the correct gear, always
4. Maximize use of 5<sup>th</sup> gear
5. Clean air filter regularly
6. Good braking habits
7. Keep your foot off the clutch
8. Don't wait for your car engine to warm up.
9. Watch your tyre pressure
10. When you stop your car, stop the engine
11. Use recommended grade of engine oil
12. Plan your route
13. Plan your trips
14. Use air-conditioner only when it is essential
15. Reduce loads
16. Share your car-for car pools

Install engine heating system in cold regions.

[www.p cra.org](http://www.p cra.org)

Along the roadside, avenue plantations should be done with species like Pilkhan, Moulisari, Mahogany Budhas Coconut, Haldu, Marorphali etc., as these species are hardy, more efficient in pollution abating and suitable for roadside plantations. The species like *Putranjiva*, Moulisari and *Lagerstroemia* are having good and beautiful foliage and good capacity to absorb the air pollutants including dust.

[www.chandigarh.nic.in/greencap/protect1.pdf](http://www.chandigarh.nic.in/greencap/protect1.pdf)



# Response Centre Feedback Form



YES ! I WANT TO KNOW  
ABOUT ENVIS CHANDIGARH  
Chandigarhenvis

Dear Information Seeker,

ENVIS CENTRE, Chandigarh furnishes you with the services to collect and disseminate information related to environment of Chandigarh. To share information with us you are requested to fill up the form given below.



Your feedback is valuable to us and will be highly appreciated

- Name \_\_\_\_\_
- Designation \_\_\_\_\_
- Department \_\_\_\_\_
- Address \_\_\_\_\_  
\_\_\_\_\_ City \_\_\_\_\_
- State \_\_\_\_\_ Country \_\_\_\_\_ Pin [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
- Phone \_\_\_\_\_ Fax \_\_\_\_\_
- Email \_\_\_\_\_

Your views on scope of improvement :

- Interest Area \_\_\_\_\_

I would like to have information on following :



# At The End of...



## ENVIS CENTRE TEAM

**Mr. P.J.S. Dadhwal**  
Project Coordinator  
**Er. Arun Bansal**  
Sr. Programme Officer  
**Ms. Shelly Aggarwal**  
Information Officer  
**Mrs. Shikha Aggarwal**  
Web Assistant  
**Mr. Surinder Kumar**  
Data Entry Operator

## TIPS TO SAVE FUEL IN KITCHEN

- Pressure cooking saves fuel
- Use optimum quantity of water
- Reduce the flame when boiling starts
- Soak before cooking
- Shallow, wide vessels save fuel
- Put the lid on heat losses
- The small burner saves fuel
- A clean burner helps save fuel
- Allow frozen food to reach room temperature before cooking

WHERE DO U LIVE



Healthy Environment



Polluted Environment

## USEFUL ENVIRONMENTAL WEB LINKS

<http://www.imd.gov.in/>  
<http://www.gpcb.gov.in>  
<http://www.cpcb.nic.in/>  
<http://www.eoearth.org>  
[http://en.wikipedia.org/wiki/Air\\_pollution](http://en.wikipedia.org/wiki/Air_pollution)  
[www.edugreen.teri.res.in/EXPLORE/air/air.htm](http://www.edugreen.teri.res.in/EXPLORE/air/air.htm)

<http://encarta.msn.com/>  
<http://www.cseindia.org>  
[www.iisc.ernet.in/~currsci/sep252004/741.pdf](http://www.iisc.ernet.in/~currsci/sep252004/741.pdf)  
[www.mpcb.mah.nic.in/airtrends/test2.htm](http://www.mpcb.mah.nic.in/airtrends/test2.htm)  
[www.coe.mse.ac.in/kidsair.asp](http://www.coe.mse.ac.in/kidsair.asp)  
<http://www.chandigarhenvvis.gov.in>

## FROM :

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To,

Book Post

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Note : While every care has been taken in compilation of the information available for this newsletter. However, readers must make thorough confirmation/enquiries at their own level before acting upon any data/information provided to the readers. Any discrepancy brought in the notice of ENVIS CENTRE, Chandigarh will be highly appreciated.

