



Greater Roanoke Valley Asthma and Air Quality Coalition

Air Pollutant Profile

Particulate Matter 2.5

Particulate matter, or PM, is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. Particles can be suspended in the air for long periods of time. Some particles are large or dark enough to be seen as soot or smoke. Others are so small that individually they can not be seen with the naked eye.

Some particles are directly emitted into the air. They come from a variety of sources such as cars, trucks, buses, factories, construction sites, tilled fields, unpaved roads, stone crushing, and wood burning.

Other particles may be formed in the air from the chemical change of gases. They are indirectly formed when gases from burning fuels react with sunlight and water vapor. These can result from fuel combustion in motor vehicles, at power plants, and in other industrial processes. The primary chemical constituents of outdoor particles are sulfate, nitrate, organic and black carbon.

PM-2.5 is primarily the result of industrial burning, tailpipe emissions, smoke from wood stoves, and open and prescribed burning.

Particulate Matter is a year around problem with the summer months being the most severe. Current PM 2.5 levels and daily Air Quality Index (AQI) forecasts can be found on the DEQ website: www.deq.state.va.us/airquality/. Local media outlets also provide daily forecasts.

Particulate Matter . . .

- is associated with serious health effects.
- is associated with increased hospital admissions and emergency room visits for people with heart and lung disease.
- is associated with work and school absences.
- is the major source of haze that reduces visibility in many parts of the United States, including our National Parks.
- settles on soil and water and harms the environment by changing the nutrient and chemical balance.
- causes erosion and staining of structures including culturally important objects such as monuments and statues.

Health problems for sensitive people can worsen if they are exposed to high levels of PM for several days in a row. Many scientific studies have linked breathing PM to a series of significant health problems, including:

- aggravated asthma
- increases in respiratory symptoms like coughing and difficult or painful breathing
- chronic bronchitis
- decreased lung function
- premature death

AQI CODE	Color Code (Description)	PM 2.5 in micrograms per cubic meter
0 – 50	GREEN (Good)	0.0 ug/m ³ – 15.4 ug/m ³
51 – 100	YELLOW (Moderate)	15.5 ug/m ³ – 35.4 ug/m ³
101 – 150	ORANGE (Unhealthy for Sensitive Groups)	35.5 ug/m ³ – 65.4 ug/m ³
151 – 200	RED (Unhealthy)	65.5 ug/m ³ – 150.4 ug/m ³
201 - 300	PURPLE (Very Unhealthy)	150.5 ug/m ³ – 250.4 ug/m ³

Particulate Matter Standards - Particulate Matter 2.5 (PM 2.5) measure less than 2.5 micrometers and are so small that several thousand could fit on the period at the end of this sentence (or about 1/30 the diameter of a human hair). Distant sources probably account for about half of the PM 2.5 in the Roanoke Valley, with coal-fired power plants the biggest contributor. There are two PM 2.5 standards. One is a 24-hour average standard, which was made more stringent in 2006, and the other is for an annual arithmetic mean standard. The new 24-hour PM 2.5 Standard is met when the 3-year average of the 98th percentile values at each monitoring site is less than or equal to 35.4 micrograms/cubic meter. This comparison is based on 3 consecutive, complete years of air quality data. The annual PM 2.5 standard is met when the 3-year average of the spatially average annual means is less than or equal to 15.0 micrograms/cubic meter. The 3-year average of the spatially averaged annual means is determined by averaging quarterly means at each monitor to obtain the annual mean PM 2.5 concentrations at each monitor, then averaging across all designated monitors, and finally averaging 3 consecutive years. Under the EPA rules, air should not contain more than 15 micrograms of particles per cubic meter. A region would be out of compliance if its air contained higher levels, on average, for three years.

Roanoke Valley 24-Hour Data

Top Five Highest 24 – hour average readings from Roanoke Valley TEOM monitor*

Date	ug/m3	(2008 Standard)	(1997 Standard)
		AQI	AQI
June 13, 2008	49.0	123	-
August 07, 2007	44.6	116	-
September 10, 2005	41.9	111	104
August 05, 2005	41.3	111	103
August 13, 2005	41.0	110	102

*Based on VA DEQ website data. Data is not official until quality assured/verified by VA DEQ and EPA. TEOM monitor began operation May 2005. The TEOM monitor is not used to determine compliance. This table is provided as an indication of our worst air quality days for PM 2.5. Older averages converted to 2008 AQI for comparison.

Roanoke Valley Annual Data

Roanoke PM 2.5 Data - Raleigh Court Monitor

Year	1 Qtr	2 Qtr	3 Qtr	4 Qtr	Annual	3-yr ave.
1999	NA	14.7	20.0	NA	14.9	
2000	14.8	16.8	16.5	15.4	15.9	(1999-2001)
2001	11.6	15.9	19.1	12.5	14.8	15.2
2002	12.8	13.4	19.7	11.6	14.4	(2000-2002)
2003	11.0	13.3	18.4	11.3	13.5	(2001-2003)
2004	10.7	14.4	18.3	10.8	13.5	(2002-2004)
2005	11.4	14.6	22.7	11.8	15.1	(2003-2005)
2006	12.1	13.5	18.5	12.5	14.2	(2004-2006)
2007	12.6	13.5	19.1	11.5	14.2	(2005-2007)
						14.5

Roanoke PM 2.5 Data - Oakland Blvd Monitor

Year	1 Qtr	2 Qtr	3 Qtr	4 Qtr	Annual	3-yr ave.
2006	-	-	-	11.8	-	-
2007	10.5	13.7	19.4	10.6	13.6	-

Source: Virginia DEQ <http://www.deq.virginia.gov/airmon/pm25home.html> - data in micrograms per cubic meter