

How much NO₂ and PM_{2.5} emissions were produced by the official fireworks display in central London on New Year's Eve?

NO_x – 28.8Kg

Solids 1264Kg (only a small amount of which would be PM_{2.5} and many of which would be soluble)

There is currently no data or scientific study undertaken in relation to fireworks and PM_{2.5} emissions, largely because of the nature of explosives in scientific laboratories and tests which result in more than just small particles. However most of the particles produced will be soluble so in all likelihood on a damp December evening, most particles will not be inhaled given the distance the audience are away from the display.

To conclude, the show produced an equivalent TOTAL of gasses that equates to the same amount as approx. 340 people traveling 30km to visit central London – ie 0.3% of the amount that people produced coming to the show.

For NO_x – the amount produced was equivalent to about 4000 people - ie 3.6% of the amount produced by people coming to the show

Answer backup information and references

This paper was prepared by [REDACTED] of Carndu Ltd. On behalf of Jack Morton Worldwide. In response to the above enquiry.

Assumptions

Total NEC – 1600kg

No of people – 110,000

Average travel distance – 30km

Show duration – 720 secs

Approx. site dimensions (l x w x h - for calcs on deposition) 100m x 200m x 300m

Approx fallout area – 4 x site area

The she contained a standard mix of pyrotechnics consisting shells & candles.

The following table outlines an estimated breakdown of gasses produced by the London New Year's Eve display

Calculations of combustion by-products

	Kg/100Kg	Total Kg	g/s
Carbon Dioxide	16.40	262.4	364.4
Carbon Monoxide	7.00	112.0	155.6
Sulphur Dioxide	0.40	6.4	8.9
Nitrogen Oxides	1.80	28.8	40.0
Nitrogen	5.20	83.2	115.6
Barium carbonate	6.40	102.4	142.2
Barium Sulphate	1.40	22.4	31.1
Potassium Sulphide	14.20	227.2	315.6
Potassium carboanate	12.40	198.4	275.6
Potassium Sulphate	11.40	182.4	253.3
Potassium Chloride	2.20	35.2	48.9
Barium oxide	0.60	9.6	13.3
Aluminium Oxide	18.20	291.2	404.4
Potassium oxide	0.80	12.8	17.8
carbon	0.05	0.8	1.1
Metal salts	11.40	182.4	253.3
Totals	109.9	1757.6	2441.1
Total Gasses	30.8	492.8	684.4
Total Nox	1.8	28.8	40.0
Total solids	79.1	1264.8	1756.7