



Gas concentration values – Air pollution in the vicinity of eruption sites

Children, elderly persons, pregnant women and those who suffer from underlying cardiovascular and lung diseases are advised not to travel to the eruption sites if any air pollution is expected. In addition, there may be surface pollution in soil, snow and surface water due to heavy metals and the collection of fluorides (F). As a rule, surface pollution is generally in the immediate neighbourhood of eruption sites.

Further information:

Concentrations in the tables below are shown in two formats:

- ppm (parts per million), which corresponds to millilitres of gas in a cubic metre of air
- % of volume, corresponding to litres of a gas per 100 litres of air.

SO₂ – Sulphur dioxide. An extremely toxic gas. Commonly has the same odour as fireworks. Colourless gas, although the smell can begin to be found at 0.3–1.4 ppm and is easily noticed at values of 3 ppm and above. A blue-tinged mist may form at high concentrations. SO₂ forms sulphurous acid and sulphuric acid (H₂SO₃ and H₂SO₄) on contact with moisture (e.g. rain).

Concentration (ppm)	Health effects relating to SO ₂	Response
0–0.4	No symptoms or mild respiratory tract / eye irritation.	
0.5	Maximum pollution limit based on 8-hour exposure.	
1	Maximum pollution limit based on 15-minute exposure.	Public evacuation at 1 ppm Gas mask from 1 ppm–10 ppm Complete evacuation at 10 ppm
1–5	Healthy individuals show respiratory symptoms on exertion or deep breathing.	
3–5	Odour is very noticeable, lung function during rest is restricted and increased resistance in respiratory tract / breathing difficulties.	
5	Significant odour, increased breathing difficulties in healthy persons.	
6	Significant odour. Irritation in eyes, nose and throat.	
10	Significant odour. Symptoms become worse, breathing difficulties and irritation in eyes, nose and throat.	
10–15	Staying within the polluted area is prohibited except for very short durations (minutes).	
20+	Paralysis or sudden death unless duration is severely limited (minutes).	

H₂S – Hydrogen sulphide – Extremely toxic gas, colourless and with an odour similar to that of hot springs or rotten eggs, although there are some who do not detect it.

Concentration (ppm)	Health effects relating to H ₂ S	Response
0.008–0.2	Significant odour (rotten eggs).	
5	Significant odour. Maximum pollution limit based on 8-hour exposure.	
10	Significant odour. Maximum pollution limit based on 15-minute exposure.	Public evacuation at 10 ppm Gas mask from 10–50 ppm Complete evacuation at 50 ppm
20	Sense of smell paralysed. Can be tolerated for a short period without damage.	
20–50	Irritation in eyes.	
50	Irritation in eyes, bronchitis after long exposure.	
60	Lengthy exposure causes conjunctivitis and eye pain.	
150+	Irritation in the upper respiratory tract (100 ppm is max GasPro).	
250	Pulmonary oedema and risk of sudden death.	

CO₂ – Carbon dioxide. Odourless, colourless and toxic gas.

Concentration (%)	Health effects relating to CO ₂ pollution	Response
0.04–0.5	Minor effects; air may seem stuffy when values rise.	
0.5	Maximum pollution limit based on 8-hour exposure.	
1	Maximum pollution limit based on 15-minute exposure.	Evacuation to higher elevation
2–3	Shortness of breath, gasping.	
5	Difficulty breathing, increased sweating, increased pulse rate.	
7.5	Headache, dizziness, restlessness, shortness of breath, increased heart rate and increased blood pressure, fast pulse, muscular weakness, visual impairment.	Escape equipment Breathing apparatus
10	Respiratory distress, loss of hearing, nausea and vomiting, loss of consciousness within 10–15 minutes.	
15	Fatal concentration, sudden death imminent.	Clean air
30	Convulsions and loss of consciousness after a few breaths, death.	

CO – Carbon monoxide. Odourless, colourless and severely toxic gas.

Concentration (ppm)	Health effects	Response
0–20	No or minor effects, possible dizziness.	
20	Maximum pollution limit based on 8-hour exposure.	
100	Maximum pollution limit based on 15-minute exposure.	Evacuation Clean air
>100	Can be harmful to human health.	
>800	Dizziness, depleted consciousness, muscle pain.	
>1,600	Headache, dizziness, death within 2 hours.	

O₂ – Oxygen.

Concentration (%)	Health effects	Response
21–20	No effects.	
<20–16	Increased heart rate, hyperventilation and diminished attention and memory.	Evacuation of The public at <20% O₂ Escape equipment Clean air
<14	Abnormal tiredness on exertion, mental instability, lack of co-ordination and decrease of judgement ability.	
<12	Extreme lack of judgement and co-ordination, vomiting, breathing difficulties that have an effect on heart function.	
<10	Vomiting, slow movement, perhaps loss of consciousness, inability to perform energetic movements or complete lack of ability to move.	
<6	Seizures, respiratory distress, cardiac arrest, spasmodic breathing, death in five minutes.	
<4	Loss of consciousness after 1–2 breaths.	

It is important to keep in mind that when pollution limits are based on the average of an 8-hour working day, the pollution concentration of each period (maximum of 15-minute periods) may not exceed the equivalent of the pollution levels in question. Pollution limits, cf. Regulation No. 390/2009, as amended. Oxygen values are based on the values stated in Regulation No. 429/1995 on safety measures when working in confined spaces.