

Measuring range for IVL's diffusive samplers

The measuring range (lower and upper detection limits) is not a concentration interval but an interval of pollutant amount in the sample. The corresponding concentrations depend on the exposure time.

The normal sampling time for diffusive sampling in ambient air is one month. Below, the approximate measuring ranges for one-month sampling are given. The concentration limits are inversely proportional to the exposure time. If you want to calculate it for a shorter time interval, the numbers below should be multiplied by one month and divided with the exposure time in question. For sampling times exceeding one month, a sampling time of one month is used for calculation of the concentration.

The formaldehyde sampler can only be exposed for maximum one week.

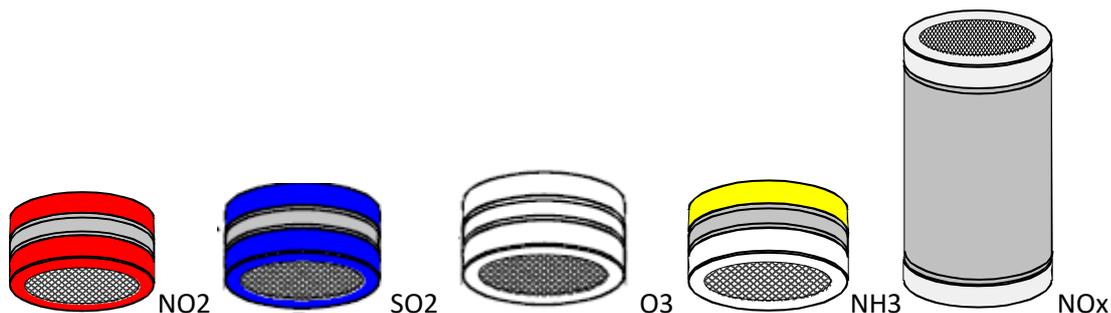
Example

The measuring range for sulphur dioxide during 40 hours is:

$$\text{Lower det limit} = \frac{24 \cdot 30 \cdot 0.1}{40} = 2 \mu\text{g}/\text{m}^3$$

$$\text{Upper det. limit} = \frac{24 \cdot 30 \cdot 200}{40} = 3600 \mu\text{g}/\text{m}^3$$

$\mu\text{g}/\text{m}^3$, STP	LOD	lineality
NO₂	0.1	200
NO_x(NO+NO₂)	0.8	1800
HNO₃	0.03	10
O₃	1.5	140
NH₃	0.5	30
SO₂	0.1	200
formic acid	1.5	150
acetic acid	2.0	250
hydrogen fluoride, HF	0.1	40
Hydrogen chloride, HCl	0.3	100
Formaldehyd, HCHO	0.05	210





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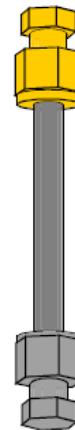
Volatile Organic Compounds (VOC) can also be measured using diffusive sampling. The exposure time should, however, not exceed one week (Tenax) and the temperature should not exceed 25 °C.

Another sorbent (Carbopack B) can be used 2 or 4 weeks and at higher temperatures.

Below, the measuring ranges for one-week sampling are given for Tenax and Carbopack B.

Tenax Diffusive 1 week measurement

BTEX µg/m ³	LOQ	lineality
benzene	0.18	100
toluene	0.20	90
n-butylacetate	0.50	70
n-octane	0.13	100
ethylbenzene	0.09	70
m+p-xylene	0.36	70
o-xylene	0.12	70
n-nonane	0.12	100



Carbopack B Diffusive 2 or 4-week measurements

BTEX:	LOQ	LOQ	Lineality	Lineality
	2 weeks	4 weeks	2 weeks	4 weeks
benzene	0.32	0.17	12	6.5
toluene	0.14	0.07	14	6.9
n-octane	0.14	0.07	21	10
ethylbenzene	0.06	0.03	15	7.5
m+p-xylene	0.16	0.08	16	8.5
o-xylene	0.05	0.03	16	8.5
n-nonane	0.12	0.06	25	12

Example

The measuring range for benzene using Tenax during 8 hours is:

$$\text{Lower det. limit} = \frac{24 \cdot 7 \cdot 0.18}{8} = 3.8 \mu\text{g m}^{-3}$$

$$\text{Upper det. limit} = \frac{24 \cdot 7 \cdot 100}{8} = 2100 \mu\text{g m}^{-3}$$