Guidance

Air emissions risk assessment for your environmental permit

How to complete an air emissions risk assessment, including how to calculate the impact of your emissions and the standards you must meet.

From:
Environment Agency (https://www.gov.uk/government/organisations/environment-agency) and Department for Environment, Food & Rural Affairs (https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs)
Published
1 February 2016
Last updated
19 May 2021 — See all updates

Applies to:
England (see guidance for Wales (http://naturalresources.wales/apply-for-a-permit/?lang=en), Scotland (https://www.sepa.org.uk/regulations/air/), and Northern Ireland (https://www.doeni.gov.uk/topics/pollution))

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Before you start this risk assessment

Read the following guides before you start this risk assessment:

- the risk assessment overview (https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit) – this explains the other steps to take in risk assessment and whether you need to do an air emissions risk assessment
- best available techniques (BAT) (https://www.gov.uk/guidance/best-available-techniques-environmental-permits) from the European Commission – you may need to apply, or in some cases exceed, BAT depending on how harmful your emissions could be to the environment

How this risk assessment works

You need to compare the impact of your emissions to air to the following environment standards:

- Ambient Air Directive Limit Values
- Ambient Air Directive and 4th Daughter Directive Target Values
- UK Air Quality Strategy Objectives
- Environmental Assessment Levels

Find the environmental standards.

Steps to complete this risk assessment

To complete an air emissions risk assessment you need to follow these steps.

1. Calculate the environmental concentration of each substance you release into the air – known as the process contribution (PC).
2. Identify PCs with insignificant environmental impact so that they can be ‘screened out’ – this means that you do not have to assess them any further.
3. For substances not screened out in step 2, calculate the predicted environmental concentration (PEC) for each substance you release to air – the PEC is the PC plus the concentration of the substance already present in the environment.
4. Identify emissions that have insignificant environmental impact – these can be screened out.
5. Get ‘detailed modelling’ (also known as detailed assessment or computer modelling) done for the emissions you cannot screen out.
6. For each substance you’ve released to air, compare the PC and PEC with the relevant environmental standard and summarise your results.
7. Check if you need to take further action.
8. Check if you need to do any other risk assessments.

The Environment Agency sometimes refers to the following stages of air emissions risk assessment:

- ‘stage 1’ – this is steps 1 and 2
- ‘stage 2’ – this is steps 3 and 4

Risk assessment tool

You should use the Environment Agency’s risk assessment tool (https://www.gov.uk/government/collections/risk-assessments-for-specific-activities-environmental-permits#H1-software-tool) to complete your risk assessment. The only stage you cannot use it for is to screen out PCs or PECs of substances in protected areas.

The figures the tool gives you are ‘worst case’ estimates. So the figures you get may be higher than if you calculate PCs or PECs using other methods, for example dispersion modelling software (which analyses how air pollutants disperse in the atmosphere).

This guide explains the steps to complete if you’re not using the risk assessment tool.

Calculate PC to air

You must calculate both your short-term and long-term PC to air for each substance. PC to air is measured in micrograms per cubic metre.

To calculate the PC to air, multiply the dispersion factor, in micrograms per cubic metre per gram per second, by the release rate, in grams per second.

If you do not have existing data

Use estimates if you do not have existing data (for example if your activity is new).

Where possible, use estimates based on similar operations elsewhere or from trials. Otherwise, use worst-case estimates.

State what assumptions you’ve made for these estimates.

Grouping air emissions

If you release volatile organic compounds into the air and do not know what all the substances in them are, treat them all as 100% benzene in your risk assessment. If you want to treat them as something else, you’ll need to explain why.

Oxides of nitrogen

Emissions of oxides of nitrogen should be recorded as nitrogen dioxide in your risk assessment (as nitrogen oxide converts to nitrogen dioxide over time):

- for short-term PCs and PECs, assume only 50% of emissions of oxides of nitrogen convert to nitrogen dioxide in the environment
- for long-term PCs and PECs, assume all oxides of nitrogen convert to nitrogen dioxide

When your site does not operate all the time

Adjust your figures down, based on the percentage of the year that your site is not operating. For example, a site that only operates January to June should reduce its PC figures by 50%. This only applies to annual average calculations and not short term assessments.

When using the risk assessment tool, you can enter the percentage into ‘operating mode’ and it will do the calculation for you.

PC: dispersion factor

The risk assessment tool calculates intermediate dispersion factors where the effective height is between given values.

If you’re not using the tool, this table shows the dispersion factors you can use. These factors are based on the point at which the substance is effectively released into the air (known as the ‘effective height of release’).

You must use different dispersion factors if your site has landfill gas engines, flares or capped areas.

All dispersion factors are shown in micrograms per cubic metre per gram per second.

Effective height of release in metres	Annual dispersion factor	Monthly dispersion factor	Hourly dispersion factor
0	148	529	3900
10	32	33.7	580
20	4.6	6.2	161
30	1.7	2.3	77
50	0.52	0.68	31
70	0.24	0.31	16
100	0.11	0.13	8.6
150	0.048	0.052	4
200	0.023	0.026	2.3

Effective height of release: impact of nearby buildings

Treat the effective height of release as 0 metres when the emission is actually released at a point that's either:

- less than 3 metres above the ground or building on which the stack is located
- more than 3 metres above the ground or the building, but less than the height of the tallest building within a distance that's 5 times 'L'

'L' is the lowest of either:

- the height of the building
- the greatest width between 2 points at the same height of the building (for example between 2 opposing corners of a roof)

When the effective height of release is more than 3 metres above the ground or building, but less than 2.5 times the building's height, estimate it by following these steps.

1. Take the actual height of release.
2. Subtract the height of the tallest building within a distance 5 times L (this can be the building where the emissions are coming from, if it's the tallest).
3. Multiply the figure that's left by 1.66.

When the actual stack height is more than 2.5 times the building height, the actual stack height can be treated as the effective height of release.

Dispersion factor: landfill gas engines, flares or capped areas

Dispersion factors for landfill gas engines, flares or capped areas are based on the shortest distance from the gas engine to whichever of these is nearest:

- the site boundary
- the nearest sensitive receptor

You can download the following dispersion factors, shown in micrograms per cubic metre per gram per second.

- Landfill gas engines: hourly dispersion factors (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/447759/landfill_gas_engines_hourly_dispersion_factors.csv) (CSV, 901Bytes)
- Landfill gas engines: annual dispersion factors (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/447767/landfill_gas_engines_annual_dispersion_factors.csv) (CSV, 863Bytes)
- Landfill gas flares: hourly dispersion factors (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/558836/Landfill_gas_flares_hourly_dispersion_factors.csv) (CSV, 737Bytes)
- Landfill gas flares: annual dispersion factors (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/447770/landfill_gas_flares_annual_dispersion_factors.csv) (CSV, 730Bytes)
- Landfill capped areas: hourly and annual dispersion factors (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/453717/landfill_capped_areas_hourly_and_annual_dispersion_factors.csv) (CSV, 476Bytes)

PC: release rate

Calculate the release rate by taking the substance's actual gas flow in cubic metres per second.

Multiply this number by the substance's concentration (in milligrams per cubic metre) divided by 1000.

When a substance is released from more than one point (for example from several chimneys from a factory), you must add up the substance's PC from each source (for example a chimney) to get the total PC for the substance. The risk assessment tool will do this calculation for you.

You should also describe:

- how the concentration of an emission varies over the time of day or year
- if you're generating power, the energy demand when a release happens, for example whether it's average demand or peak demand

Calculating averaging periods

You should use the same averaging period when you compare the impact of your emissions against long-term environmental standards.

Most long-term standards are expressed as an annual average (mean). Most short term standards as an hourly average. But sometimes the short-term environmental standard is measured using a different time period (for example 15 minutes). So if you've calculated a PC on an hourly basis, you must multiply it by:

- 1.34 to convert it into a 15 minute average
- 0.7 to convert it into an 8 hour average
- 0.59 to convert it to a 24 hour average

For sulphur dioxide, the ‘short term’ periods are 15 minutes, 1 hour and 24 hours. Multiply the hourly dispersion factor by 1.34 to get the 15 minute dispersion factor and multiply this by 0.59 to get the 24 hour average.

Calculate PC for substance deposition

The following substances require you to calculate the impact they have when absorbed by soil and leaves (known as ‘deposition’):

- arsenic
- cadmium
- chromium
- copper
- fluoride
- lead
- mercury
- molybdenum
- nickel
- selenium
- zinc

The impact on the soil is known as ‘PC to ground’. You calculate this as follows.

1. Do this calculation: long-term PC to air × release rate × 0.01 × 3 × 86,400.
2. Divide the number you get by 1,000.

The number you’re left with is the PC to ground, in milligrams per square metre per day.

Screen out insignificant PCs

To screen out a PC for any substance so that you do not need to do any further assessment of it, the PC must meet both of the following criteria:

- the short-term PC is less than 10% of the short-term environmental standard
- the long-term PC is less than 1% of the long-term environmental standard

If you meet both of these criteria you do not need to do any further assessment of the substance.

If you do not meet them you need to carry out a second stage of screening to determine the impact of the PEC. Record the PCs for your insignificant emissions in your risk assessment.

Assess insignificant PCs to ground

The following are PC to ground limits in milligrams per square metre per day:

- arsenic – 0.02
- cadmium – 0.009
- chromium – 1.5
- copper – 0.25
- fluoride – 2.1

- lead – 1.1
- mercury – 0.004
- molybdenum – 0.016
- nickel – 0.11
- selenium – 0.012
- zinc – 0.48

If the PC to ground for any of these substances is below 1% of the limit it's insignificant.

If the PC to ground is 1% of the limit or greater, you may need to do further assessment such as detailed modelling. You should contact the Environment Agency if you think you may need to do further assessment.

Calculate PEC

You must calculate the short and long term PECs of PCs to air that were not screened out in the first stage.

To calculate the short and long term PECs of PCs to air, combine the following:

- each substance's PC to air
- the concentration of the substance that's already present in the environment - the 'background concentration'

Record these figures in your risk assessment.

You can find out about background concentrations from:

- your local council
- background concentration maps (https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html) from the government
- the Air Pollution Information System (APIS) (http://www.apis.ac.uk) (for SPAs, SACs and SSSIs)

This information will usually be shown as a long-term (annual) average concentration.

Background concentrations may already include PCs from your site. To avoid your PCs being double-counted, use a background concentration from a source that is not affected by the direction that the wind predominantly blows from (that is the prevailing wind direction). For example, if the prevailing wind comes from the west, do not use a background concentration from a source to your east.

> When you calculate background concentration, you can assume that the short-term background concentration of a substance is twice its long-term concentration.

Screen out PECs from detailed modelling

In the second stage of screening if you meet both of the following requirements you do not need to do any further assessment of that substance. You'll need to do detailed modelling of emissions that do not meet both of the following requirements:

- the short-term PC is less than 20% of the short-term environmental standards minus twice the long-term background concentration
- the long-term PEC is less than 70% of the long-term environmental standards

Screening for protected conservation areas

You must consider the impact of your site on protected conservation areas. Complete this nature and heritage conservation screening form (https://www.gov.uk/government/publications/environmental-permit-nature-and-heritage-conservation-screening) to find out if any are near your site.

The screening process for protected conservation areas is limited to the emissions and emission periods in these environmental standards for protected conservation areas.

Substance	Target (mean)	Emission period
Ammonia	1 microgram per cubic metre where lichens or bryophytes (including mosses, landworts and hornwarts) are present, 3 micrograms per cubic metre where they're not present	Annual
Sulphur dioxide	10 micrograms per cubic metre where lichens or bryophytes are present, 20 micrograms per cubic metre where they're not present	Annual
Nitrogen oxide (expressed as nitrogen dioxide)	30 micrograms per cubic metre	Annual
Nitrogen oxide (expressed as nitrogen dioxide)	75 micrograms per cubic metre	Daily
Hydrogen fluoride	0.5 micrograms per cubic metre	Weekly
Hydrogen fluoride	5 micrograms per cubic metre	Daily
Nutrient nitrogen deposition	Depends on location - use APIS (http://www.apis.ac.uk/search-pollutant-impacts) to check it	Annual
Acidity deposition	Depends on location - use APIS (http://www.apis.ac.uk/search-pollutant-impacts) to check it	Annual

Check if there are any of the following within 10km of your site:

- special protection areas (SPAs)
- special areas of conservation (SACs)
- Ramsar sites (protected wetlands)

Check if there are any of the following within 2km of your site:

- sites of special scientific interest (SSSIs)
- local nature sites (ancient woods, local wildlife sites and national and local nature reserves)

For some larger (greater than 50 megawatt) emitters may be required to screen to:

- 15km for European sites
- 10km or 15km for SSSIs

You should screening for the impact of air emissions on protected conservation areas to 15km for both of the following:

- natural gas (or fuels with a similarly low sulphur content) fired combustion plants, with more than 500 megawatt thermal input
- some larger combustion plants using more sulphurous fuels with more than 50 megawatt thermal input

You need to discuss relevant screening distances at pre-application.

When there are SPAs, SACs, Ramsar sites and SSSIs within the specified distance

If your emissions that affect SPAs, SACs, Ramsar sites or SSSIs meet both of the following criteria, they're insignificant - you do not need to assess them any further:

- the short-term PC is less than 10% of the short-term environmental standard for protected conservation areas
- the long-term PC is less than 1% of the long-term environmental standard for protected conservation areas

If you do not meet these requirements you need to calculate the PEC and check the PEC against the standard for protected conservation areas.

You do not need to calculate PEC for short-term targets.

If your short-term PC exceeds the screening criteria, you need to do detailed modelling.

If your long-term PC is greater than 1% and your PEC is less than 70% of the long-term environmental standard, the emissions are insignificant – you do not need to assess them any further.

If your PEC is greater than 70% of the long-term environmental standard, you need to do detailed modelling.

For SPAs, SACs and Ramsar sites, you need to consider the 'in combination' (combined) impact of all permissions, plans or projects that affect the site. Contact the Environment Agency for further guidance on in-combination assessments.

When there are local nature sites within the specified distance

If your emissions meet both of the following criteria they're insignificant – you do not need to assess them any further:

- the short-term PC is less than 100% of the short-term environmental standard
- the long-term PC is less than 100% of the long-term environmental standard

You do not need to calculate PEC for local nature sites. If your PC exceeds the screening criteria you need to do detailed modelling.

You cannot use the risk assessment tool to check how significant a PC or PEC is for deposition of nutrient nitrogen or acidity. This is because nutrient nitrogen and acidity targets vary depending on location. The APIS site-relevant critical load tool will tell you the standard that you need to compare the PC or PEC against.

Record the PCs and PECs and the nitrogen and acidity critical load values you used for your insignificant emissions in your risk assessment.

There are different rules about what's insignificant in air emissions from intensive farming (https://www.gov.uk/guidance/intensive-farming-risk-assessment-for-your-environmental-permit).

Contact the Environment Agency for more information about modelling and screening for protected conservation areas.

Detailed modelling

You must do detailed modelling for any PECs not screened out as insignificant.

To do detailed modelling, you need to use computer software that models the passage of a substance as it travels through the atmosphere until it reaches the ground.

Detailed modelling requires specialist knowledge. You can find a consultant (https://www.endsdirectory.com) to do it for you. They'll charge for their services. Contact the Environment Agency if you want to do your own detailed modelling.

For information on detailed modelling for environmental permitting applications see Environmental permitting: air dispersion modelling reports (https://www.gov.uk/guidance/environmental-permitting-air-dispersion-modelling-reports).

Air Quality Management Areas

Unless your process contribution (PC) is insignificant, you must have detailed modelling done if both of the following apply:

- your emissions affect an Air Quality Management Area (AQMA)
- restrictions apply for any substance you emit in this area

Check if your site is in an AQMA. (https://uk-air.defra.gov.uk/aqma)

More accurate data

You can have detailed modelling done if you've used the risk assessment tool to do your risk assessment but you want to provide data that's:

- more accurate – the tool does not include the plume rise (a factor that affects the effective height of release) of your emissions in its calculations
- less pessimistic – for example if you want to show that your emissions are a lower risk than the risk assessment tool's estimates

Varying emission rates

The risk assessment tool assumes a constant emission rate for each substance over a year. You may need to do detailed modelling if your site's output varies a lot, for example the output from a chemical factory or a power station can vary a lot from day to day. Check with the Environment Agency if you're not sure.

Compare and summarise your results

In your application you need to include all of the following:

- the PC
- the PEC
- the substances you've screened out
- the substances that have had a detailed assessment
- the relevant environmental standards that you referred to when evaluating your emissions
- any additional action that you think you need to take, for example a cost benefit analysis

Check if you need to take further action

Your pre-application discussions with the Environment Agency may have already shown that you need to take further action, such as a cost benefit analysis of your proposals.

Your risk assessment may also show that you need to take further action.

When you do not need to take further action

You do not need to take further action if your assessment has shown that both of the following apply:

- your proposed emissions comply with BAT associated emission levels (AELs) (https://www.gov.uk/guidance/best-available-techniques-environmental-permits) or the equivalent requirements where there is no BAT AEL
- the resulting PECs will not exceed environmental standards

When you need to take further action

You'll need to do a cost benefit analysis if any of the following apply:

- your PCs could cause a PEC to exceed an environmental standard (unless the PC is very small compared to other contributors – if you think this is the case contact the Environment Agency)
- the PEC is already exceeding an environmental standard
- your activity or part of it is not covered by a 'BAT reference document' (BREF)
- your proposals do not comply with BAT AELs - in this case you'll need to make a request for an exception ('derogation') that includes a cost benefit analysis of your proposals
- you've been asked to do a BAT assessment

When you need to contact the Environment Agency

In all other cases or if you're not sure whether you need to take further action, contact the Environment Agency.

Cost benefit analysis tool

The Environment Agency has produced a cost benefit analysis tool to help you. Contact the Environment Agency for this tool.

Check if you need to do other risk assessments

You'll need to check if you need to do any other risk assessments (https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit#risks-from-your-specific-activity)

Once you've done all the required risk assessments, submit them with your permit application. You can also use the risk assessment tool to submit this risk assessment.

Environmental standards for air emissions

Compare the impact of your air emissions against the following environmental standards when you do your air emissions risk assessment.

Ambient Air Directive Limit Values

Under EU directives, the Environment Agency must make sure your proposals do not exceed Ambient Air Directive (AAD) Limit Values. You should check if you need to take further action if either:

- an AAD Limit Value is already exceeded at your location
- an AAD Limit Value could be exceeded by your proposed activity

Substance	Emission period	Limit (average)	Standard	Exceedances (number of times a year that you can exceed the limit)

Substance	Emission period	Limit (average)	Standard	Exceedances (number of times a year that you can exceed the limit)
Benzene	Annual	5 micrograms per cubic metre	AAD Limit Value and AQS Objective	None
Carbon monoxide	8 hour running average across a 24 hour period	10 milligrams per cubic metre	AAD Limit Value	None
Lead	Annual	0.5 micrograms per cubic metre	AAD Limit Value	None
Nitrogen dioxide	1 hour	200 micrograms per cubic metre	AAD Limit Value	Up to 18 1-hour periods
Nitrogen dioxide	Annual	40 micrograms per cubic metre	AAD Limit Value	None
Nitrogen oxides (as NO2)	Annual mean if nature or conservation sites are in your area	30 micrograms per cubic metre	AAD Limit Value	None
Particulates (PM10)	24 hour	50 micrograms per cubic metre	AAD Limit Value	Up to 35 times a year
Particulates (PM10)	Annual	40 micrograms per cubic metre	AAD Limit Value	None
Particulates (PM2.5)	Annual	20 micrograms per cubic metre	AAD Limit Value	None
Sulphur dioxide	1 hour	350 micrograms per cubic metre	AAD Limit Value	Up to 24 1-hour periods

Substance	Emission period	Limit (average)	Standard	Exceedances (number of times a year that you can exceed the limit)
Sulphur dioxide	24 hour	125 micrograms per cubic metre	AAD Limit Value	Up to 3 24-hour periods
Sulphur dioxide	Annual mean if you have nature or conservation sites in the area	20 micrograms per cubic metre	AAD Limit Value	None

Ambient Air Directive Target Values and UK Air Quality Strategy Objectives

Under the law, you will not usually have to go further than BAT (https://www.gov.uk/guidance/best-available-techniques-environmental-permits) to comply with either of the following for PC emissions:

- AAD Target Values
- UK Air Quality Strategy (AQS) Objectives

As substances covered by these standards could still damage the environment, the Environment Agency may decide that you need to take further action if your emissions of a substance will be significant in relation to these standards.

The Environment Agency will decide this on a case by case basis. It will then let you know if you need to take further action, for example carrying out a cost benefit analysis.

Substance	Emission period	Target (mean)	Standard	Exceedances (number of times a year you're allowed to exceed the target)
1,3-butadiene	Running annual (this is a mean of every hourly level, starting from the latest hour and including each of the preceding 8759 hours)	2.25 micrograms per cubic metre	UK AQS Objective	None
Arsenic	Annual	6 nanograms per cubic metre	AAD Target Value	None
Cadmium	Annual	5 nanograms per cubic metre	AAD Target Value	None
Lead	Annual	0.25 micrograms per cubic metre	UK AQS Objective	None
Nickel	Annual	20 nanograms per cubic metre	AAD Target Value	None

Substance	Emission period	Target (mean)	Standard	Exceedances (number of times a year you're allowed to exceed the target)
Ozone	8 hour	120 micrograms per cubic metre	AAD Target Value	Up to 1 per day (based on average for 3 8-hour periods a day - each 8-hour period will have a running average calculated hourly)
Ozone	1 hour, May to July (to protect vegetation)	18,000 micrograms per year averaged over 5 years	AAD Target Value	None
Polyaromatic hydrocarbons	Annual	1 nanogram per cubic metre of benzo(a)pyrene (BaP) total content within the PM10 fraction	AAD Target Value	None
Sulphur dioxide	15 minutes	266 micrograms per cubic metre	UK AQS Objective	Up to 35 15-minute periods

Environmental Assessment Levels

If you exceed these emissions levels, you might need to take further action to reduce your impact on the environment. The Environment Agency will tell you what you need to do.

'Further action' might include doing a cost benefit analysis of alternative waste recovery and disposal methods, or installing new equipment, like an abatement plant.

Where an environmental standard or environmental assessment level (EAL) is not listed for the substance you are assessing you can propose a new EAL.

To derive a new EAL, you can use the new hierarchy included within our 2012 consultation document Derivation of new environmental assessment levels to air (https://www.gov.uk/government/consultations/derivation-of-new-environmental-assessment-levels-to-air). You can use one of the following options:

- the Environment Agency's hazard characterisation methodology for determining tolerable concentrations in air – see section 7 and annex 5
- health criteria values for inhalation derived by the Environment Agency when developing the Contaminated Land Exposure Assessment (CLEA) programme
- the REACH methodology which involved the production of chemical specific safety reports containing derived values for protection of the environment – see section 8

You need to select the option appropriate for the toxicity of the substance.

If you use any of the these methods to derive a new EAL we may need to do a further review and consult on your proposals. Therefore you need to submit your proposal with an explanation of how you have derived it.

The following EALs have reverted to their original levels as of 13 May 2021 as we are updating the responses received to our consultation 'New air environmental assessment levels (https://www.gov.uk/government/consultations/environmental-assessment-levels-eals-used-in-air-emissions-risk-

assessments)': arsenic, benzene, chloroform, chromium VI, ethylene dichloride, methyl chloroform, naphthalene, tetrachloroethylene, trichloroethylene and vinyl chloride. Mono-ethanolamine and N-nitrosodimethylamine (NDMA) have been removed.

Substance	Annual limit in micrograms per cubic metre	Hourly limit in micrograms per cubic metre
Acetaldehyde	370	9,200
Acetic acid	250	3,700
Acetic anhydride	1	40
Acetone	18,100	362,000
Acetonitrile	680	10,200
Acrylamide	0.6	18
Acrylic acid	300	6000
Acrylonitrile	8.8	264
Allyl alcohol	48	970
Ammonia	180	2,500
Aniline	8	240
Antimony and compounds (as antimony) except antimony trisulphide and antimony trioxide	5	150
Arsenic	0.003	-
Arsine	1.6	48
Benzene	5	195
Benzo alpha pyrene	0.00025	-
Benzylchloride	5.2	158
Beryllium (total in the PM10 fraction)	0.0002	-
Boron trifluoride	-	280
Bromine	-	70
Bromomethane	200	5,900
Butane	14,500	181,000
Carbon disulphide	64	100

Substance	Annual limit in micrograms per cubic metre	Hourly limit in micrograms per cubic metre
Carbon monoxide	-	30,000
Carbon tetrachloride	130	3,900
Chlorine	-	290
Chloroform	99	2,970
Chloromethane	1,050	21,000
Chromium III, chromium III (compounds and chromium III compounds (as chromium)	5	150
Chromium VI	0.0002	-
Copper dusts and mists (calculated as copper)	10	200
Dibutyl phthalate	50	1,000
Diethyl ether	12,300	154,000
Diethyl ketone	7,160	89,500
Diisobutyl phthalate	50	1,500
Diisopropyl ether	10,600	131,000
Dimethylformamide	300	6,100
Dimethyl sulphate	0.52	15.6
Dioxane	910	36,600
Ethyl acrylate	210	6,200
Ethylbenzene	4,410	55,200
Ethylene dibromide	7.8	234
Ethylene dichloride	42	700
Ethylene oxide	18.4	552
Formaldehyde	5	100
N-hexane	720	21,600
Hydrazine	0.06	2.6

Substance	Annual limit in micrograms per cubic metre	Hourly limit in micrograms per cubic metre
Hydrogen bromide	-	700
Hydrogen chloride	-	750
Hydrogen cyanide	-	220
Hydrogen fluoride	16 (monthly average)	160
Hydrogen iodide	5 (monthly average)	520
Hydrogen sulphide	140	150
Manganese and compounds (as manganese)	0.15	1,500
Mercury and compounds, except mercury alkyls (as mercury)	0.25	7.5
Methanol	2,660	33,300
Methylene chloride	700	3,000
Methyl chloroform	11,100	222,000
Methyl ethyl ketone	6,000	89,900
Methyl propyl ketone	7,160	89,500
Naphthalene	530	8,000
Nitric acid	52	1,000
Nitrogen monoxide	310	4,400
Orthophosphoric acid	-	200
Para-dichlorobenzene	1,530	30,600
Phenol	200	3,900
Phosgene	0.8	25
Phosphine	-	42
Polychlorinated biphenyls (PCBs)	0.2	6
1-propanol	5000	62500
2-propanol	9,990	125,000

Substance	Annual limit in micrograms per cubic metre	Hourly limit in micrograms per cubic metre
Propylene oxide	24	720
Selenium and compounds, except hydrogen selenide (as selenium)	1	30
Sodium hydroxide	-	200
Styrene	800	800
Sulphur hexafluoride	60,700	759,000
Sulphuric acid	10	300
Tetrachloroethylene	3,450	8,000
Tetrahydrofuran	3,000	59,900
Toluene	1,910	8,000
1,2,4-trichlorobenzene	76	2,280
Trichloroethylene	1,100	1,000
Trimethylbenzenes, all isomers or mixture	1,250	37,500
Vanadium	5	1
Vinyl acetate	360	7,200
Vinyl chloride	159	1,851
Xylene (o-, m-, p- or mixed isomers)	4,410	66,200
Zinc oxide	50	1,000

PECs: targets for protected conservation areas

Substance	Target (mean)	Emission period
Ammonia	1 microgram per cubic metre where lichens or bryophytes (including mosses, landworts and hornwarts) are present, 3 micrograms per cubic metre where they’re not present	Annual
Sulphur dioxide	10 micrograms per cubic metre where lichens or bryophytes are present, 20 micrograms per cubic metre where they’re not present	Annual

Substance	Target (mean)	Emission period
Nitrogen oxide (as NO2)	30 micrograms per cubic metre	Annual
Nitrogen oxide (as NO2)	75 micrograms per cubic metre	Daily
Hydrogen fluoride	0.5 micrograms per cubic metre	Weekly
Hydrogen fluoride	5 micrograms per cubic metre	Daily
Nutrient nitrogen deposition	Depends on location - use APIS (http://www.apis.ac.uk/search-pollutant-impacts) to check it	Annual
Acidity deposition	Depends on location - use APIS (http://www.apis.ac.uk/search-pollutant-impacts) to check it	Annual

Contact

Contact the Environment Agency for more information about your air emissions risk assessment.

General enquiries

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Monday to Friday, 8am to 6pm.

The office is closed due to COVID-19. However, we are still receiving and dealing with post.

The impact of COVID-19 on our teams means you may experience some delays in responses as most of our staff will be working from home.

Published 1 February 2016
Last updated 19 May 2021 + show all updates

1. 19 May 2021
   The following EALs have reverted back to their original levels as of 13/05/21 as consultation responses are still being processed for 'New air environmental assessment levels'. (arsenic, benzene, chloroform, chromium VI, ethylene dichloride, methyl chloroform, naphthalene, tetrachloroethylene, trichloroethylene and vinyl chloride and removed 2 new ones (mono-ethanolamine and N-nitrosodimethylamine (NDMA).

2. 17 May 2021
   Updated the screening distances for natural gas (or fuels with a similarly low sulphur content) fired combustion plants, with more than 500MW thermal input and some larger combustion plants using more sulphurous fuels with more than 50MW thermal input to within 15km of protected conservation areas. Also updated the EALs for arsenic, benzene, chloroform, chromium VI, ethylene dichloride, methyl chloroform, naphthalene, tetrachloroethylene, trichloroethylene and vinyl chloride and added 2 new ones (mono-ethanolamine and N-nitrosodimethylamine (NDMA)) following our consultation 'New air environmental assessment levels'
3. 7 October 2020
   New guidance added on deriving a new Environmental Assessment Level.
4. 2 August 2016
   Amendments to sections: 'Screen out insignificant PECs' now called 'Screen out PECs from detailed modelling' regarding the second stage of screening. And ‘Screening for protected conservation areas’ - a change was made which incorrectly pre-empted work currently being undertaken around thermal size and screening distances. The text has been changed back to the original text; 10km for an installation or 15km for a coal/oil fired power station. Where thermal size is large (greater than 50 megawatt) a larger screening distance may be more appropriate and it is recommended that further advice is sought from National Permitting Service.
5. 1 March 2016
   Minor changes to wording to clarify scientific and legal interpretation of definitions.
6. 1 February 2016
   First published.

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