



ENVIRONMENT
AGENCY

**Air dispersion modelling report
requirements
(for detailed air dispersion modelling)**

1.0 SUGGESTED STRUCTURE OF THE MODELLING REPORT

The guidance lists the elements of a report that are expected to be present in an air dispersion modelling report.

1.1 INTRODUCTION/SCOPE

- General information relating to the assessment, including purpose of the study, description of the site and modelled scenarios.

1.2 LOCATION MAP

- A map showing the location of the process in relation to nearby features and urban conurbations, and indicating the extent of the modelled domain, European sites, Sites of Special Scientific Interest, Special Protection Areas, Special Areas of Conservation and ambient air quality monitoring sites. The map should use National Grid Referencing and indicate terrain contours, e.g. Ordnance Survey Landranger Series (1:50,000 scale).

1.3 POLLUTANTS, AIR QUALITY GUIDELINES AND OTHER ASSESSMENT CRITERIA

- A list of pollutants modelled. The pollutants under consideration in the assessment should be clearly identified, including chemical speciation (e.g. oxides of nitrogen, halogenated compounds). Discussion of relevant air quality standards and objectives appropriate to the modelled pollutants. These will often take the form of the standards and objectives contained in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland, but may also consider guidelines from other sources, e.g. World Health Organisation (WHO), Occupational Exposure Levels (OELs), Agency Technical Guidance Note E1/H1. For assessment in relation to the Habitats Directive, discussion of the relevant critical levels and/or critical loads.

1.4 AMBIENT/BACKGROUND LEVELS

- For all pollutants under consideration an appropriate value for background concentration should be determined. This may take the form of ambient monitoring data from local authorities or maps of ambient concentration produced by NETCEN, however the source and validity of information used should be justified by the applicant. Future predictions of ambient levels should be also addressed if appropriate for the assessment.

1.5 MODEL DESCRIPTION

- The choice of model used in the assessment should be justified and a description of the chosen air dispersion model given. Information should include model name, type of model (Gaussian, new-generation, etc.), supplier and version of model used. Models must be fit for purpose, based on established science, and be validated and independently reviewed. EAS/2007/1/1 contains Agency policy on choice of air dispersion models.

1.6 EMISSION PARAMETERS

- The following information, including relevant units should be presented in a table.

Parameter	Units
Stack Location	(NGR)
Stack height	(m)
Pollutant emission rate	(g/s) ^{1, 2, 3}
Exit diameter	(m)
Exit temperature	(K, °C)
Efflux velocity (actual), and/or	(m/s)
Volumetric flow rate (actual)	(m ³ /s)

- Note that pollutant emission rate is often calculated using a measured concentration value, or a value taken from an appropriate Process Guidance Note, and the volumetric flow. It should be made clear whether concentration values expressed at STP/NTP have been adjusted appropriately to derive the emission rate used in the model and, if so, the method used.
- Including details of time-varying emissions if appropriate
- Emission of NO_x should be expressed as NO₂.

1.7 MODELLED DOMAIN/RECEPTORS

- The extent of the modelled domain (i.e. the modelled area), and the resolution of the model receptor grid used should be reported and justified by the applicant. The assumed height above ground level for the receptors (flagpole height) should be reported if appropriate.
- Details of any discrete receptors used to assess impact at sensitive locations should be reported.

1.8 METEOROLOGY/SURFACE CHARACTERISTICS

- The choice of meteorological data used in the model should be discussed in detail and justified by the applicant. Information should include the location of the chosen met station in relation to the modelled domain, the number of years included in the assessment, and the source of the data (currently either UK Met Office or BREEZE Met CD). The format of the met data used (either hourly sequential or long-term statistical) should be reported and justified and a windrose presented for purposes of clarity.
- Information relating to the surface characteristics at both the meteorological station and within the modelled domain should be reported. This is usually related to the relevant land-use classification(s) however the values of parameters (e.g. roughness length, albedo, Bowen ratio/Priestly-Taylor parameter) describing the classifications used in the model should also be reported.

1.9 TREATMENT OF TERRAIN

- The applicant should justify the inclusion or not of terrain treatment in the assessment and report the source, format and processing of digital terrain data used in the model.

1.10 TREATMENT OF BUILDINGS AND SITE PLAN

- The applicant should justify the inclusion or not of building treatment in the assessment and report the location and dimensions of all buildings included in the model (i.e. NGR, height, width, rotation). A site plan showing the location and relative orientation of buildings and their dimensions should be included.

1.11 SENSITIVITY ANALYSIS

- This should include a discussion and quantification of model sensitivity to meteorological data (e.g. different met sites, inter-annual variation, surface characteristics), emission parameters (stack parameters, pollutant release rate, different plant operating scenarios), receptor grid resolution, and treatment of terrain and buildings. A final quantification of model uncertainty should be reported taking the above into account.

1.12 SPECIAL TREATMENTS

This should include relevant information on specialised model treatments, for instance short-term (puff) releases, coastal models, fluctuations, photochemistry, wet/dry deposition, flare releases, etc.

1.13 ASSESSMENT OF IMPACTS

- A discussion on the post-processing of relevant percentile values and addition of background concentrations should be provided including conversion factors for different averaging times if appropriate.
- Any assumptions relating to pollutant conversion processes (e.g. NO/NO₂ photochemistry) for different averaging times should be justified.
- Results should be presented in tabular form, indicating total (process plus background) concentration values and locations of maximum air quality impacts and the process contribution to this. The percentage impact upon the relevant air quality standard or objective should also be reported.
- Contour plots should be provided for each air quality objective being assessed (including critical levels and/or critical loads if appropriate). These should indicate pollutant name and modelling scenario, averaging time and appropriate percentile plotted and should clearly indicate areas of exceedance. The same colour scale should be used for all contour plots relating to a particular air quality objective.
- Discussion should address any potential breaches of relevant air quality standards or objectives (including critical levels and/or critical loads if appropriate). This should take into account model uncertainty, assessment of different stack heights and emission characteristics and different process operation scenarios.

1.14 MODEL INPUT FILES

- Input files for the air dispersion model used in the assessment should be included as an Appendix to the report, usually on computer disk. These should be sufficient that model configuration and the parameter values used to define all source and meteorological inputs to the model can be audited.

1.15 FURTHER INFORMATION

- Further detailed information relating to the above topics is contained in “Guidance on detailed air dispersion modelling of point source emissions”. Information is also available directly from AQMAU or on the AQMAU Intranet pages.

2.0 CHECKLIST.

The following form should be included as a prefix to an air dispersion modelling report:

Item	Y / N	Reasons for omission
Location map		
Site plan		
List of pollutants modelled and relevant air quality guidelines		
Details of modelled scenarios		
Details of relevant ambient concentrations used		
Model description and justification		
Special model treatments used		
Table of emission parameters used		
Details of modelled domain and receptors		
Details of meteorological data used (including origin) and justification		
Details of terrain treatment		
Details of building treatment		
Details of modelling wet/dry deposition		
Sensitivity analysis		
Assessment of impacts		
Model input files		