



Odour Complaints Checklist

(updated April 2011)

The purpose of this checklist is to aid the early investigation of an odour complaint. Such complaints may be reported as a nuisance issue or be related to health effects. Odours can often be the first indicator of a potentially serious incident. This checklist is primarily intended for public health practitioners at Health Protection Units and Environmental Health Officers who may be asked to deal with local odour-related complaints.

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Section 1 – Source and nature of the odour - hazard identification

Recommendations for questions to ask the caller

Source and nature of the odour

- Describe the odour, what does it smell like? Table 1 (odour characterisation)
- What is the strength of the odour (intensity), is it a faint, mild, strong or a very strong odour?
- Does the odour strength/intensity vary?
- Is the odour perceived to be pleasant, mildly pleasant, strongly unpleasant or very strongly unpleasant (hedonic tone)¹?
- **When was the odour first noticed?**
- Is the odour persistent or intermittent?
- Is there any temporal variation in the odour?
- Is there any seasonal variation in the odour?
- Has there been a chemical spill, accident?
- Can the source be identified? If so where is it coming from?
- Is the odour inside the building?
- Is the odour outside the building?

Tick box

¹ Hedonic tone is a judgment of the relative pleasantness or unpleasantness of an odour.

Section 4 - Recommendations for the acute phase response

Our sense of smell is a valuable source of information about chemicals in the environment. For some chemicals the fact that we can smell them is a warning to move away from the source hence protecting ourselves from further exposure. For the vast majority of chemicals we can smell them before toxicological effects, including irritation, occurs. However, for a few chemicals the toxic threshold is below the odour threshold and once it is detected, toxicity may already have occurred (see Appendix 1).

Suggested actions

If significant health effects are likely due to exposure to chemicals that are odorous (see Appendix 1) then an immediate response is necessary:

- Removal from the source of exposure by elimination of source
 - Is the source of the odour known?
 - If known can it be removed?
- Interrupting the exposure pathway.
 - Open windows (if the odour is inside)
 - Close windows (if the odour is outside)
- Removing receptor
 - Evacuate at risk individuals to location away from odour source
 - Advise affected individuals to seek medical advice
 - Inform local GP or A&E of possible presentation of those affected

If a gas-like odour is reported, advise the caller to immediately ventilate the property and contact the National Gas Emergency number (free): **0800 111 999**

Section 5 - Legislation

Odour 'pollution' is controlled primarily under the [Environmental Permitting \(EP\) Regulations](#) and the [Environmental Protection Act \(EPA\) 1990](#)

5a) Regulation of odour

Industries are regulated under the EP regulations in order to prevent pollution of the environment and harm to human health, including odour. The regulatory authorities are the Environment Agency (EA) and Local Authorities (LA). Permits to operate odorous industries are issued either by the EA or the LA, depending on the scale of the operation, and will have conditions relating to odour control. A breach of these conditions will be dealt with by the relevant organisation.

Examples of activities regulated by the EA - landfills, intensive farming, refining gas. For more details see [Environment Agency - Environmental permitting](#)

Examples of activities regulated by the LA - animal rendering, printing and textile treatment, small scale incineration (pet crematoria). For more details see [Defra - Local Authority guidance for Environmental Permitting](#)

5b) Odour as a nuisance

Section 79 of EPA defines statutory nuisances including:

*any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being **prejudicial to health or a nuisance.***

Hence there are two limbs for enforcement action for odours.

- The nuisance limb

There is no definition of nuisance in the Act but to be actionable the nuisance must be 'substantial and unreasonable'. It is the duty of LA's to take action under this legislation.

- The health limb

The definition of the health limb appears in section 79(7) of the EPA as being **'injurious, or likely to cause injury to health'**

The test for whether a matter is prejudicial to health must be if it results in ill health in the form of disease. It demands more than mere discomfort or annoyance and requires proof of harmful effects or the risk of such effects. Where an allegation of prejudice to health is made, there must be some expert evidence to substantiate the claim.

Section 6) - Recommendations for post incident investigation

- Agencies potentially involved in odour investigations are:
 - Health Protection Unit, PCT (for possible health effects of exposure)
 - LA Environmental Health (for EP regulated sites and for nuisance claims)
 - Environment Agency (for EP regulated sites)
 - Health and Safety Executive (exposure to odours in an occupational setting)
 - Centre for Radiation, Chemicals and Environmental Hazards of the HPA
 - Meteorological Office (for air dispersion modelling)
 - Others such as water utilities, industry etc.

- Effects on health could be a matter of concern; the local population should be closely involved in any investigations at an early stage and should be kept as fully informed of developments as soon as possible

References

Environmental Permitting (England and Wales) Regulations 2010 (S.I. No.675), The Stationary Office Limited

Environmental Protection Act 1990 (c.43), The Stationery Office Limited, ISBN 01054439051

The Pollution Prevention and Control (England and Wales) Regulations 2000, The Stationery Office Limited, ISBN 0110996216

Appendix 1: Odour characteristics and detection threshold levels

Odorants and odour

When considering odours, it is important to make the distinction between the concepts of 'odorants' and 'odours'. 'Odorants' are the chemical compounds that are capable of being translated by our nervous system into what we term 'odours'. 'Odours' are the subjective products of neural stimulation in the brain. Some odorants have toxicological properties i.e. have irritant properties as well as odorant characteristics.

Odour threshold values

Table 1: provides a list of common chemical odorants, their potential sources, descriptions and odour thresholds where available. Please note that the values quoted are for single odorants only. A range of values signifies variability in the population and are an approximate guide only. The quality of odour detection threshold data can be poor. 'Odour measurement and control - an update' (Woodfield and Hall 1994) differentiates between chemicals for which threshold values have been determined by a recognised test method and those chemicals where threshold values have not been determined by a recognised test method. The data quality for compounds determined by recognised methods are more likely to approach the "true value". The table below contains odour thresholds which are known with sufficient confidence for air pollution modelling purposes (*) and odour thresholds which are less certain (**).

Odour descriptors

Descriptors can help to establish the source of an odour and it is useful, when recording information from an incident, to seek the description of the odour.

Table1: Odour descriptors, odour threshold ranges, and odour threshold values of common odorants
(consolidated and adapted from Woodfield and Hall 1994 and The Royal Society of Chemistry Chemical Data Sheets 1989 -1992)

Compound	Examples of potential sources	Descriptor where available	Reported threshold Range ⁻³ mg m	Odour threshold ⁻³ mg m	Odour threshold ppm
Acetaldehyde **		apple, stimulant	0.00001-0.004		
Acetic acid *		sour vinegar	0.025 - 0.064	0.043	0.016
Acetic anhydride *		pungent, vinegar		0.0013	0.00029
Acetone *	Nail polish remover, some detergents	chemical/sweet/solvent	1.4 - 40.2	13.9	4.58
Acrylic acid *		distinctive, acrid		0.0013	0.0004
Acrylonitrile **		onion, pungent, garlic	4.65		
Ammonia **	Animal farming, household cleaning products	sharp, pungent	0.1 – 11.6		
Amyl acetate *		banana	0.27 – 0.96	0.95	0.163
iso Amyl acetate *				0.022	0.0038
Benzene *		solvent	1.5 – 108	32.5	8.65
Benzyl benzene **		oranges	0.41		
Benzyl chloride **		solvent	0.045 – 1.5		
Benzyl mercaptan		garlic, leeks	0.000002-0.00003		
Bromine **		bleach, pungent	5E-06		
1,3-Butadiene *		mild, petrol	0.45 – 1.1	1.1	0.455
Butane **		natural gas	2100		
1-Butanol *			0.02 – 0.55	0.09	0.03
2-Butanol *				3.3	1
2-Butanone (MEK) *			0.5 – 1.29	0.87	0.27
Butoxybutane *				0.03	0.005
2-Butoxyethanol *			0.004 – 0.006	0.0051	0.00097
2-Butoxyethyl acetate *				0.045	0.0063
Butoxypropanol *				0.191	0.0324
Butyl acetate *		fruity, mild banana	0.006 – 0.7	0.047	0.0066
2-(2-Butoxyethoxy)ethanol *				0.0092	0.0013
2,2-butoxyethoxyethyl acetate *				0.015	0.0016

Compound	Examples of potential sources	Descriptor	Reported threshold Range mg m ⁻³	Odour threshold mg m ⁻³	Odour threshold ppm
Carbon tetrachloride *		sweet, ether	280 – 884	280	40.73
Carbon sulphide *				0.0275	0.0102
Chlorine **		irritating, pungent	0.23 – 3.0		
Chlorobenzene **		Mothballs	5.9		
Chlorocresole **			142.6		
Chloroform **		pleasant sweet	119.4		

Chloropicrin **		intensely irritating	0.000073		
m-Cresol *	Cresols have a wide variety of uses, wood preservative, resins and motor fuels	sweet, tar		0.0013	0.0003
o-Cresol *		sweet, tar		0.0028	0.0005
p-Cresol *		tar-like, pungent		0.0029	0.0006
Cyclohexane *		sweetish when pure, pungent when contaminated		315	83.8
Cyclohexanone *		acetone-like		0.083	0.019
1,4-Dichlorobenzene **		mothball	0.73		
Dichloromethane *		sweet, penetrating, ether	0.02 – 5.7	3.42	0.912
Diesel *		Distinctive		0.06	
Dimethyl adipate *				7.101	0.913
Dimethyl glutarate *				1.212	0.169
Dimethyl succinate *				0.992	0.152
1,4-Dioxane *			3.0 - 31	30.6	7.78
1,3-Dioxolane *				56.3	17.02
Diphenylmethane *		oranges		0.41	0.55
Ether **		pungent, aromatic	2.4	0.011–1.0	
Ethoxypropanol *				0.161	0.035
Ethoxypropyl acetate *				0.0052	0.0008
Ethyl acetate *		fragrant	1.25 – 3.82	2.41	0.61
Ethyl alcohol *		pleasant, wine	0.17 – 0.39	0.28	0.136
2-Ethyl-1-butanol *				0.07	0.015
2-Ethyl-1-hexanol *				0.5	0.086
2-Ethylhexyl acrylate *				0.6	0.073
Formaldehyde **	Occurs naturally during the combustion of biomass. Motor vehicle emissions	disinfectant, pungent, suffocating	0.49		
Formic acid **		pungent, suffocating	2		
2-Furaldehyde *				0.25	0.058
Fluorine **		pungent, choking	0.15		
Glutaldehyde **		pungent	0.08		
1-Hexanol *			0.00004 - 0.006	0.005	0.0011
Hydrogen chloride **	Cleaning, electroplating metals	pungent, irritating	0.39 - 7		
Hydrogen sulphide *	Produced naturally and from human activity. Produced from landfills, stagnant water, manure	rotten eggs		0.00076	0.0005
2-Hydroxyethyl acetate *				0.527	0.114
Light fuel oil *		distinctive		0.053	
3-Methylbutanal *				0.0016	0.0004

Compound	Examples of potential sources	Descriptor	Reported threshold Range mg m ⁻³	Odour threshold mg m ⁻³	Odour threshold ppm
2-Methyl-1-butanol *				0.16	0.041
Methyldithiomethane *			0.001 – 0.046	0.0011	0.00026
Methyl methacrylate *		acidic fruity		0.38	0.085
2-Methyl 5-ethyl pyridine *				0.032	0.006
Methyl isobutyl ketone *	Paint solvents, lacquer	sweet	0.24 – 0.81	0.54	0.121
Methyl methacrylate *		pungent, sulphide like		0.38	0.085
3-Methoxybutyl acetate *				0.044	0.007
1-Methoxypropan-2-ol *				0.0122	0.003
1-Methoxy-2-propylacetate *				0.0075	0.0014
2-Methyl-1-pentanol *				0.096	0.021
2-Methyl pentaldehyde *				0.09	0.02
4-Methyl-2-pentanone (MIBK) *			0.24 – 0.81	0.54	0.121
2-Methyl-2-propanol *				71	21.46
α-Methyl styrene *				0.021	0.003
Naphthalene **		mothballs	0.2		
Nitric acid **		sweet, acrid, choking	0.7		
Nitrobenzene **		bitter almonds	0.2		
Nitrogen dioxide **		acidic, pungent	0.02 - 2		
1-Octene *			0.33 - 37	0.33	0.066
2-Octene *				0.5	0.1
2-Octyne *				0.03	0.006
2,4-Pentanedione *				0.045	0.01
1-Pentanol *				0.02	0.0051
Petrol (light) **		distinctive	800 - 3300		
Petroleum naphtha *		distinctive		0.2	
Phenol	Found in petroleum and coal tar. Used as a disinfectant and in medical preparations	sweet tarry, carbolic acid	0.046 – 0.8		
Phenyl ether *				0.0021	0.0003
Phosgene **		mouldy hay	4		
Phosphine **		garlic, decaying fish	2.8		
2-Picoline *				0.014	0.0034
Propanal *			0.0036–0.014	0.014	0.0054
2-Propanol *		ethanol and acetone mix	1.18 – 1.19	1.185	0.442
2-Propen-1-ol *				1.2	0.47
iso Propylamine *				0.158	0.06
Propylbenzene *				0.048	0.009
Propylene-n-butylether *				0.206	0.01
Propyl ether *				0.024	0.0053
Pyridine **		nauseating, fish, burnt	0.0037 – 2.4		
Sulphur dioxide **		irritating, suffocating	0.00009		
Styrene *	Produced in the making of gasoline and other fuels from crude oil	penetrating, rubbery, plastic		0.16	0.0344
1,1,2,2-Tetrachloroethane *		pungent, chloroform	1.6 – 12.0	1.6	0.21
Toluene *	Produced in the making of gasoline and other fuels	floral, pungent, moth balls	0.47 – 0.79	0.644	0.16

	from crude oil				
Trichloroethylene *	Extraction solvent for greases, oils and fats – dry cleaning	solventy	6.5 – 34.9	8	1.36
Trimethylamine *		fishy, pungent		0.0026	0.001
Xylene (mixed) *	Produced in the making of gasoline and other fuels from crude oil	aromatic, sweet	0.062 – 0.097	0.078	0.016
2,3 Xylenol *	Disinfectants, solvents, lubricants			0.0037	0.0007
2,4 Xylenol *	Disinfectants, solvents, lubricants			0.064	0.0117

Reference for odour threshold data

Woodfield and Hall, Odour measurement and control - an update. Prepared by AEA Technology on behalf of the Department of the Environment, 1994.

References for odour descriptors

The Royal Society of Chemistry, "Chemical Safety Data Sheets" Volumes 1 and 5 (1998 – 1992)

Leonardos G. Kendall D, et al. (1969). Odor threshold determinations of 53 odorant chemicals. Journal of the Air Pollution Control Association 19(2):91-95.

For detailed information regarding threshold toxicity values of acetic acid, acrylonitrile, ammonia, benzene, chlorine, chloroform, hydrogen chloride, formaldehyde, hydrogen cyanide, kerosene, methanol, naphthalene, nitric acid, nitrobenzene, phenol, phosgene, phosphine, petrol, sodium hypochlorite, styrene, tetrachloroethylene, toluene, trichloroethylene and vinyl chloride see HPA Compendium of Chemical Hazards <http://www.hpa.org.uk/chemicals/compendium/>

Appendix 2 – Sensory Effects of Odour

There are relatively few guideline values for odour exposure. The WHO has devised a small number of values for limiting annoyance for single compounds with malodorous properties at concentrations below that at which toxic effects occur (Table 2). In contrast to other air pollutants, odorous substances in ambient air often cannot be determined easily and systematically by analytical methods because the concentrations are usually very low.

Furthermore, odours in the ambient air frequently result from a complex mixture of substances and it is difficult to identify individual ones.

Table 2: Rationale and guideline values based on sensory effects or annoyance reactions, using an averaging time of 30 minutes

Substance	Detection threshold	Recognition threshold	Guideline value
Carbon disulfide (index substance for viscose emissions)	200 µg/m ³	–	20 µg/m ³
Hydrogen sulphide	0.2–2.0 µg/m ³	0.6–6.0 µg/m ³	7 µg/m ³
Formaldehyde	0.03–0.6 mg/m ³	–	0.1 mg/m ³
Styrene	70 µg/m ³	210–280 µg/m ³	70 µg/m ³
Tetrachloroethylene	8 mg/m ³	24–32 mg/m ³	8 mg/m ³
Toluene	1 mg/m ³	10 mg/m ³	1 mg/m ³

From World Health Organisation. Air Quality Guidelines for Europe, Second Edition. World Health Organisation Regional Publications, 2002.

Detection Threshold Values

The odour threshold value is the lowest concentration at which an odorous substance is detectable by 50% of a test panel. The concentration is expressed in parts per million (ppm) or parts per billion (ppb) by volume or in milligrams of odorant per cubic metre of air.

Recognition Threshold Values

The recognition threshold level is defined as the lowest concentration at which the odour quality (description), of the compound can be described (by 50% of a panel).

Guideline Value

Values which are likely to protect the public from odour annoyance.