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Process Guidance Note 6/36(13)

Statutory guidance for tobacco processes

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Defra would like to acknowledge the work of the Environment Agency's Local Authority Unit in the drafting of this guidance note.

Revision of the guidance

The electronic version of this publication is updated from time to time with new or amended guidance. **Table 0.1** is an index to the latest changes (minor amendments are generally not listed).

Table 0.1 - Revision of the guidance		

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1. Introduction

Legal basis

1.1 This note applies to the whole of the UK. It is issued by the Secretary of State, the Welsh Government, the Scottish Government and the Department of the Environment in Northern Ireland (DoE NI) to give guidance on the conditions appropriate for the control of emissions into the air from tobacco processes. It is published only in electronic form and can be found on the Defra website. It supersedes PG6/36(06) and NIPG6/36(06).

1.2 This guidance document is compliant with the Code of Practice on Guidance on Regulation page 6 of which contains the "golden rules of good guidance". If you feel this guidance breaches the code or you notice any inaccuracies within the guidance, please contact us.

1.3 This is one of a series of statutory notes giving guidance on the Best Available Techniques (BAT). The notes are all aimed at providing a strong framework for consistent and transparent regulation of installations regulated under the statutory Local Air Pollution Prevention and Control (LAPPC) regime in England and Wales, Scotland and Northern Ireland. The note will be treated as one of the material considerations when determining any appeals against a decision made under this legislation. Further guidance on the meaning of BAT can be found for England and Wales, Scotland, and Northern Ireland.

1.4 In general terms, what are BAT for one installation in a sector are likely to be BAT for a comparable installation. Consistency is important where circumstances are the same. However, in each case it is, in practice, for regulators (subject to appeal) to decide what are BAT for each individual installation, taking into account variable factors such as the configuration, size and other individual characteristics of the installation, as well as the locality (e.g. proximity to particularly sensitive receptors).

1.5 The note also, where appropriate, gives details of any mandatory requirements affecting air emissions which are in force at the time of publication, such as those contained in Regulations or in Directions from the Government. In the case of this note, at the time of publication there were no such mandatory requirements.

1.6 The activities covered by this note will have essentially the same characteristics and it is expected that the application form and model permit in **Appendices 1 and 2** will normally be used in order to simplify for business the process of applying for a permit and to simplify for regulators the process of issuing a permit. (See also the relevant LAPPC charging scheme for reduced application and subsistence charges for simplified permits).

If there are good reasons to consider diverging from normal use of the model permit, the starting point for drafting any additional conditions should be the arrowed bullets in the main body of this note.

Who is the guidance for?

1.7 This guidance is for:

Regulators

- local authorities in England and Wales, who must have regard to the guidance when determining applications for permits and reviewing extant permits;
- the Scottish Environment Protection Agency (SEPA) in Scotland, and district councils or the Northern Ireland Environment Agency (NIEA), in Northern Ireland;

Operators who are best advised also to have regard to it when making applications and in the subsequent operation of their installation;

Members of the public who may be interested to know what the Government considers, in accordance with the legislation, amounts to appropriate conditions for controlling air emissions for the generality of installations in this particular industry sector.

Updating the guidance

1.8 The guidance is based on the state of knowledge and understanding, at the time of writing, of what constitute BAT for this sector. The note may be amended from time to time to keep up with developments in BAT, including improvements in techniques, changes to the economic parameters, and new understanding of environmental impacts and risks. The updated version will replace the previous version on the Defra website and will include an index to the amendments.

1.9 Reasonable steps will be taken to keep the guidance up-to-date to ensure that those who need to know about changes to the guidance are informed of any published revisions. However, because there can be rapid changes to matters referred to in the guidance – for example to legislation – it should not be assumed that the most recent version of this note reflects the very latest legal requirements; these requirements apply.

Consultation

1.10 This note has been produced in consultation with relevant trade bodies, representatives of regulators including members of the Industrial Pollution Liaison Committee and other potentially-interested organisations.

Policy and procedures

1.11 General guidance explaining LAPPC and setting out the policy and procedures is contained in separate documents for England and Wales, Scotland and Northern Ireland.

2. Timetable for compliance and reviews

Existing processes or activities

2.1 This note contains all the provisions from previous editions which have not been removed. Some have been amended. For installations in operation at the date this note is published, the regulator should have already issued or varied the permit having regard to the previous editions. If they have not done so, this should now be done.

2.2 The new provisions of this note and the dates by which compliance with these provisions is expected are listed in **Table 2.1**, together with the paragraph number where the provision is to be found. Compliance with the new provisions should normally be achieved by the dates shown. Permits should be varied as necessary, having regard to the changes and the timetable.

Table 2.1 - Compliance timetable

Guidance	Relevant paragraph/row in this note	Compliance date
A simple permit and application form have been added in **Appendix 1** and **Appendix 2.**		
There are no new provisions in this note likely of themselves to result in a need to vary existing permit conditions. For a full list of changes made by this note, excluding very minor ones, see **Table 6.1**. See **paragraph 2.4**.		

2.3 Replacement plant should normally be designed to meet the appropriate standards specified for new installations/activities.

2.4 Where provisions in the preceding guidance note have been deleted or relaxed, permits should be varied as necessary as soon as reasonably practicable. It is expected that local authorities will aim to vary existing permits so as to convert them into the model permit format in **Appendix 1** within 12 months of the publication of this note.

2.5 For new activities, the permit should have regard to the full standards of this guidance from the first day of operation.

2.6 For substantially changed activities, the permit should normally have regard to the full standards of this guidance with respect to the parts of the activity that have been substantially changed and any part of the activity affected by the change, from the first day of operation.

Permit reviews

2.7 Under LAPPC, the legislation requires permits to be reviewed periodically but does not specify a frequency. It is considered for this sector that a frequency of once every eight years ought normally to be sufficient for the purposes of the appropriate Regulations. Further guidance on permit reviews is contained in the appropriate Guidance Manual for England and Wales chapter 26, Scotland, Practical guide section 10, Northern Ireland Part B Guidance page 9, Northern Ireland Part C Guidance chapter 17. Regulators should use any opportunities to determine the variations to permits necessitated by paragraph 2.2 above in conjunction with these reviews.

2.8 Conditions should also be reviewed where complaint is attributable to the operation of the process and is, in the opinion of the regulator, justified.

3. Activity description

Regulations

3.1 This note applies to LAPPC installations for tobacco processes. The activities for regulation are listed in **Table 3.1**.

Table 3.1 - Regulations listing activities

LAPPC Activity	England and Wales	Scotland	Northern Ireland
	EPR Schedule 1 reference	PPC Schedule 1 reference	PPC Schedule 1 reference
Part B	Section 6.8 Part B	Section 6.8, Part B	n/a
Part C	n/a	n/a	Section 6.8 Part C

The links are to the original version of the Regulations. A consolidated version is not available on www.legislation.gov.uk

For England and Wales, an unofficial consolidated version is available but read the first page of that document in order to understand its status and content.

3.2 In the context of this note, "process" or "activity" comprises the whole process from receipt of raw materials via production of intermediates to dispatch of finished products, including the treating, handling and storage of all materials and wastes relating to the process.

3.3 Whilst there are commercial variations in tobacco processes, particularly in respect of the different products such as cigarettes, cigars, pipe tobacco, hand rolling tobacco, other smoking materials and snuff, the basic process steps are summarised below and shown in Figure 1. Some products do not require all of the processing steps identified.

3.4 The process can be divided into two distinct phases:-

- Primary processing where tobacco leaf (lamina) and stem is prepared to the stage at which it is ready for inclusion in the finished cigarette or cigar, or for packing for sale as pipe tobacco, snuff or hand rolling tobacco.
- Secondary processing includes forming the cigarettes or cigars and packing.

3.5 Some factories at which smoking and other tobacco materials are produced undertake both primary and secondary processing. Others undertake either one or the other alone, either sending the tobacco which has been subjected to primary processing elsewhere for secondary processing, or receiving primary processed tobacco from elsewhere for secondary processing.

3.6 It is unlikely that factories undertaking only secondary processing will have any noticeable environmental impact due to air emissions: the potential for dust emissions tends to be minor and emissions of odorous gases and vapours are normally negligible. Regulators may consider that where secondary processing alone is undertaken, the potential for emissions to air of prescribed substances or odour would be trivial and hence would not require a permit or authorisation. However, this would not preclude the inclusion of conditions relating to dust emissions from secondary processing in an authorisation for a process where primary and secondary processing are both undertaken at the same processing site.

3.7 The preliminary processing of tobacco involves curing the leaf (either by air, heat or sunlight) followed by threshing to separate the lamina and the stem. This process is carried in the country of origin and hence has not been considered further. In the case of tobacco for cigar manufacture the hard leaves are not threshed before primary processing.

3.8 The tobacco is first subject to a conditioning process using steam to ensure that the tobacco is sufficiently pliable to allow the subsequent processing steps to be completed without damage to the material. In some circumstances additional materials may be added at this stage for flavouring the tobacco. If flavourings are added at this point (called casings) they are subject to a subsequent flash drying operation to ensure that the casing is incorporated within the tobacco but avoiding too much drying of the tobacco.

3.9 The conditioned tobacco is then blended to ensure a uniform quality before it is shredded by high-speed rotary knives to the desired thickness. The shredded tobacco (rag) is then subject to hot air drying and cooling before final mixing. The mixing process may include the addition of flavours, recycled tobacco from in-line wastage and dust handling equipment and possibly tobacco which has been subject to a cell expansion process to make the texture less dense.

3.10 The cell expansion operation may be undertaken at the manufacturing site or material may be processed elsewhere. The process involves expanding the cells in the tobacco by the use of a substance (for example carbon dioxide or VOCs) which can change state by pressure or temperature variation.

3.11 The subsequent process operations are the secondary processing steps. These include forming the cigar or cigarette which is undertaken mechanically. In the case of cigarettes the tobacco is wrapped within a paper and a filter is added. In cigar making the binder and wrapper may be formed from tobacco leaf. The secondary process also involves recovery of tobacco which has become an in-line waste during the process operations due to spillage, collection in dust control systems and damaged or unsatisfactory finished product.

3.12 In the case of other tobacco products, the secondary process is largely a packaging operation.

Potential releases

3.13 Contained emissions of particulate matter are largely associated with emissions from the blending, milling and threshing, cutting, drying, material transfer and mixing operations in primary processing and from the maker, material transfer and in-line tobacco recycling operations in secondary processing.

3.14 There is the potential for fugitive emissions of particulate matter which may arise from transfer of potentially dusty materials including discharge into hoppers and onto conveyors, and delivery to silos and equipment. Also material collected by bag filters may become re-entrained if it is not securely contained and carefully handled.

3.15 The emissions of VOCs may arise from two distinct operations. During primary processing, flavours may be added to the tobacco which are either themselves VOCs or which use VOCs as a carrier, diluent or solvent. These flavours are added in enclosed equipment and hence containment is relatively straightforward (some flavours may be added during the secondary processing operations but the potential releases are trivial). VOCs may also be used for cell expansion operations in a totally enclosed system and the VOC is recovered for re-use in the process.

3.16 The potential emission sources for odours are:

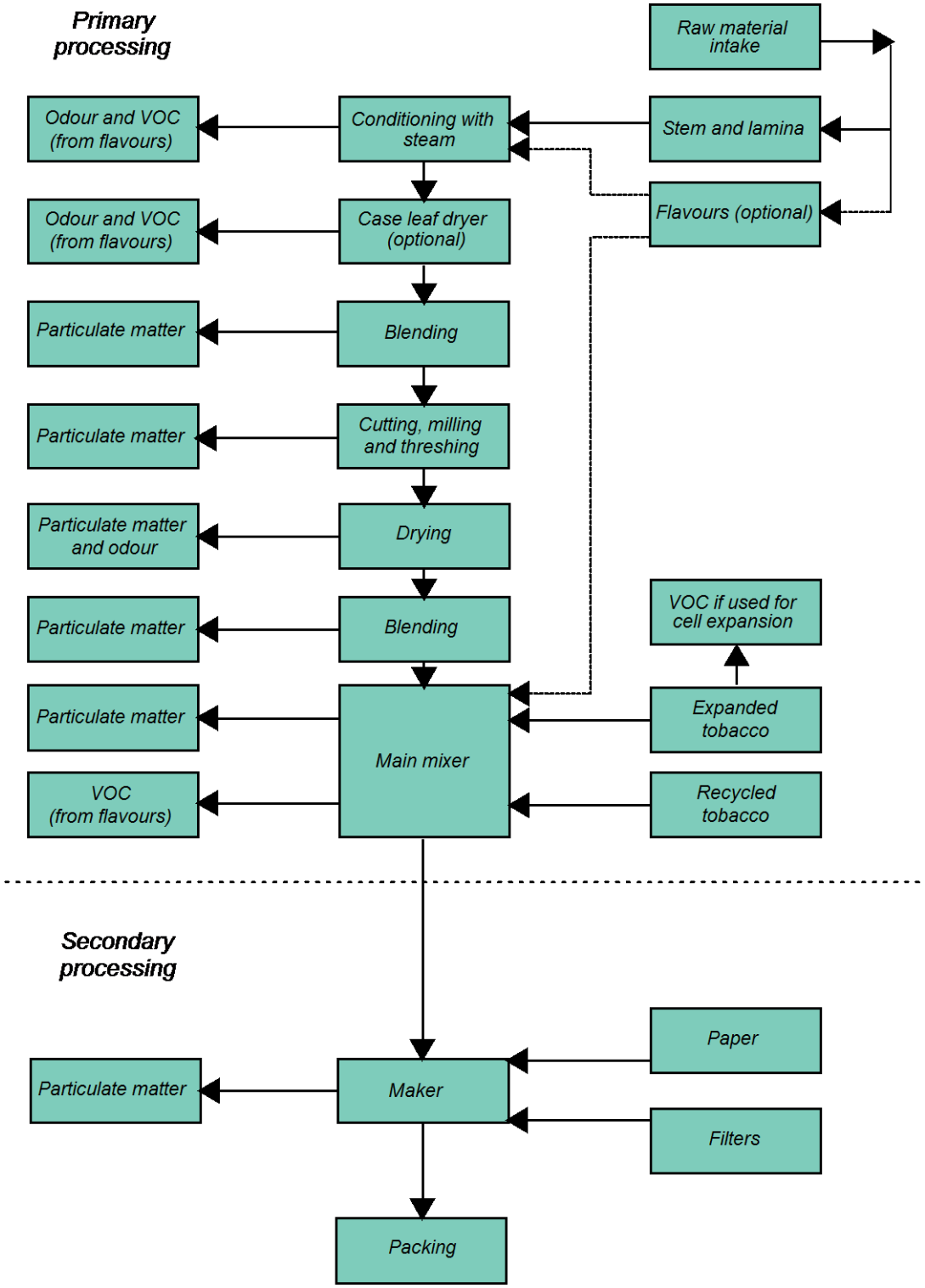
- from the application of flavours
- from the conditioning of the tobacco with steam
- from the application of heat during drying and also potentially from cooling processes
- from the storage and discharge of liquid waste and effluent from the odour abatement equipment
- from the odour abatement equipment discharge (this may be a stack or vent or may be a biofilter with an area source at ground level)
- fugitive emissions from building and process air due to lack of containment.

3.17 Where the odour abatement equipment comprises a scrubber, emissions of materials which are added to the scrubber for improved performance (such as acids, hypochlorite, sodium hydroxide etc.) may be released with the plume if the scrubber and mist eliminator are not properly managed.

3.18 Where a thermal oxidiser or other combustion plant is used for the abatement of odours, the emissions will be characteristic of the combustion releases from the fuel. These will include:-

- sulphur dioxide from the burner, influenced by the sulphur content of the fuel.
- oxides of nitrogen from the combustion equipment. The emission depends on the nitrogen content of the fuel, the amount of excess air, the flame temperature and the burner type.
- carbon monoxide, which may be emitted if the combustion process is badly managed.
- metals, volatile organic compounds, chlorides and fluorides may also be emitted where waste or recovered oil is used in the combustion equipment.

Figure 1.1: A typical tobacco process



4. Emission limits, monitoring and other provisions

4.1 Emissions of the substances listed **Table 4.1** should be controlled.

4.2 The emission limit values and provisions described in this section are achievable using the best available techniques described in **Section 5**. Monitoring of emissions should be carried out according to the method specified in this section or by an equivalent method agreed by the regulator. Where reference is made to a British, European, or International standard (BS, CEN or ISO) in this section, the standards referred to are correct at the date of publication. (Users of this note should bear in mind that the standards are periodically amended, updated or replaced.) The latest information regarding the monitoring standards applicable can be found at the Source Testing Association website. Further information on monitoring can be found in Environment Agency publications, M1 and M2.

4.3 All activities should comply with the emission limits and provisions with regard to releases in **Table 4.1**.

The reference conditions for limits in **Section 4** are: 273.1K, 101.3kPa, without correction for water vapour content, unless stated otherwise.

Table 4.1 should be considered in conjunction with the monitoring paragraphs found later in this section.

Table 4.1 - Emission limits, monitoring and other provisions					
Row	Substance	Source	Emission limits/provisions	Type of monitoring	Monitoring frequency
1	Odour	Contained process releases	Any odour abatement plant installed should have an odour removal efficiency of not less than 90% (see note 2)	Determination by manual extractive sampling and analysis by dynamic olfactometry (see note 1)	On installation of new / replacement odour abatement equipment (see note 1)
2	Particulate matter	Emissions from drying and conditioning processes where emissions are vented to cyclones and the flow exceeds 100m^3/min	50 mg/m^3	**Filter leak monitor** • provide visual alarms • record trend output and alarms **plus** • 3 yearly extractive test	• continuous **plus** • 3 yearly extractive test
3	Particulate matter	Emissions from contained process sources (other than those covered in Row 2 above) and the flow exceeds 100m^3/min	20 mg/m^3	**Filter leak monitor** • provide visual alarms • record trend output and alarms **plus** • 3 yearly extractive test	• continuous **plus** • 3 yearly extractive test
4	VOCs	Emissions from cell expansion involving the use of VOCs	Record the solvent recovery efficiency of the cell expansion process (see paragraph 5.9). Where the process is batch, a recovery efficiency of at least 95% should be achieved, for other process types the recovery efficiency should be at least 85% (see also paragraphs 4.27 and note 3).	Where cell expansion operations are carried out using VOCs, then the cooling liquid flow of all direct and indirect condensers used for solvent recovery should be continuously monitored.	

Note 1: When offensive odours are detected beyond the process boundary or complaints are received and there is no obvious cause of odour release then the operator shall check the odour abatement plant performance using indicative guide values (paragraph 4.13) and check the process operational controls. If notified by the regulator, odour removal efficiencies shall be retested.

Note 2: Where the inlet odour concentrations are very low and the 90% destruction efficiency is difficult to demonstrate due to measurement reproducibility and equipment efficiency at low concentrations, the final discharge to air should contain less than 500 odour units/m^3.

Note 3: The recovery efficiencies given in Row 4, column 3 of this table represent the average rolling efficiency based on one year of operation.

Monitoring, investigating and reporting

4.4 The operator should monitor emissions, make tests and inspections of the activity. The need for and scope of testing, (including the frequency and time of sampling), will depend on local circumstances.

- The operator should keep records of inspections, tests and monitoring, including all non-continuous monitoring, inspections and visual assessments. Records should be:
  - kept on site;
  - kept by the operator for at least two years; **and**
  - made available for the regulator to examine.
- If any records are kept off-site they should be made available for inspection within one working week of any request by the regulator.

Information required by the regulator

4.5 The regulator needs to be informed of monitoring to be carried out and the results. The results should include process conditions at the time of monitoring.

- A summary of the data identifying the times, dates and duration of alarm events from continuous monitoring of the performance of the particulate matter control system, VOC abatement system and of the odour abatement system should be submitted to the regulator at least every 6 months.
- The operator should notify the regulator at least 7 days before any periodic monitoring exercise to determine compliance with emission limit values. The operator should state the provisional time and date of monitoring, pollutants to be tested and the methods to be used.
- The results of non-continuous emission testing should be forwarded to the regulator within 8 weeks of completion of the sampling.
- Adverse results from any monitoring activity (both continuous and non-continuous) should be investigated by the operator as soon as the monitoring data has been obtained. The operator should:
  - identify the cause and take corrective action;
  - clearly record as much detail as possible regarding the cause and extent of the problem, and the remedial action taken;
  - re-test to demonstrate compliance as soon as possible; **and** inform the regulator of the steps taken and the re-test results.

Visible emissions

4.6 The aim should be to prevent any visible airborne emission from any part of the process. This aim includes all sites regardless of location. Monitoring to identify the origin of a visible emission should be undertaken and a variety of indicative techniques are available.

- where ambient monitoring is carried out it may also be appropriate for the regulator to specify recording of wind direction and strength;
- where combustion units are in use for dryers then the combustion process should be controlled and equipment maintained as appropriate.

4.7 Emissions from combustion processes in normal operation should be free from visible smoke. During start up and shut down the emissions should not exceed the equivalent of Ringelmann Shade 1 as described in British Standard BS 2742.

- All other releases to air, other than condensed water vapour, should be free from persistent visible emissions.
- All emissions to air should be free from droplets.

Where there are problems that, in the opinion of the regulator, may be attributable to the installation, such as local complaints of visual emissions or where dust from the installation is being detected beyond the site boundary, the operator should investigate in order to find out which part of their operation(s) is the cause.

If this inspection does not lead to correction of the problem then the operator should inform the regulator who will determine whether ambient air monitoring is necessary. Ambient monitoring may either be by a British Standard method or by a method agreed with the regulator.

Whilst problems are ongoing, a visual check should also be made at least once per day/shift, by the operator, when an installation is being operated. The time, location and result of these checks, along with weather conditions such as indicative wind direction and strength, should be recorded. Once the source of the emission is known, corrective action should be taken without delay and where appropriate the regulator may want to vary the permit in order to add a condition requiring the particular measure(s) to be undertaken.

Emissions of odour

4.8 The overall aim should be that all emissions are free from offensive odour outside the site boundary, as perceived by the regulator. However, the location of the installation will influence the assessment of the potential for odour impact as local meteorological conditions may lead to poor dispersion conditions. Where the site has a low odour impact due to its remoteness from sensitive receptors, the escape of offensive odour beyond the installation would be unlikely to cause harm.

4.9 Where there are problems that, in the opinion of the regulator, may be attributable to the installation, such as local complaints of odour or where odour from the installation is being detected beyond the site boundary, the operator should investigate in order to find out which part of their operation(s) is the cause.

4.10 Whilst problems are ongoing, a boundary check should also be made at least once per day/shift, by the operator, when an installation is being operated. The time, location and result of these checks, along with weather conditions such as indicative wind direction and strength, should be recorded. Once the source of the emission is known, corrective action should be taken without delay and where appropriate the regulator may want to vary the permit in order to add a condition requiring the particular measure(s) to be undertaken.

4.11 Where it is installed any odour arrestment equipment should be inspected at least once a day to verify correct operation and to identify any malfunctions. Depending upon the type of any arrestment plant used this inspection should include:

- identification of any leaks in air handling equipment and ductwork
- in the case of scrubbing equipment, thermal oxidisers and other combustion equipment, the inspection should include verification of the operation of any continuous monitoring equipment, the presence of any blockages and also identification of any leaks of either odorous air or liquid.

Indicative tests for odour abatement plant

4.12 If offensive odours are detected beyond the process boundary or complaints are received but there is no obvious cause of odour release it may be necessary to check odour abatement plant performance where it is being used. Depending upon the type of abatement plant used, the following are examples of suitable indicative testing:

- In the case of thermal oxidisers or combustion equipment, the combustion efficiency is a good indication of performance. Emissions tested, in accordance with the first bullet of paragraph 4.22, should normally be below 100mg/m^3, expressed as a 30 minute mean at 273K and 101.3kPa. If emissions exceed this indicative guide value it is likely that the odour destruction efficiency of the thermal oxidiser is reduced and it should be further investigated to identify reasons for the reduced performance.

Abnormal events

4.13 The operator should respond to problems which may have an adverse effect on emissions to air.

- In the case of abnormal emissions, malfunction or breakdown leading to abnormal emissions the operator should:
  - investigate and undertake remedial action immediately;
  - adjust the process or activity to minimise those emissions; **and**
  - promptly record the events and actions taken.
- The regulator should be informed without delay, whether or not there is related monitoring showing an adverse result:
  - if there is an emission that is likely to have an effect on the local community; **or**
  - in the event of the failure of key arrestment plant, for example, bag filtration plant or scrubber units.
- The operator should provide a list of key arrestment plant and should have a written procedure for dealing with its failure, in order to minimise any adverse effects.

Continuous emissions monitoring - general

4.14 Continuous emissions monitors (CEMs) are normally either extractive stack emission monitoring instruments, where a sample of the gas is drawn from the chimney stack or duct, generally through a sample condition line, into the measuring cell; or cross-stack (in situ) emissions monitoring instruments, where measurements of the target species are made directly within the gaseous atmosphere of the stack or duct.

Where a CEM is used for compliance purposes, it must be periodically checked (calibrated) to ensure the readings being reported are correct. This calibration is normally done by carrying out a parallel stand-alone test and comparing the results with those provided by the CEM.

Calibration tests can be performed by suitably trained in-house staff, although it is more usual for external contractors to undertake CEMs calibration when periodic testing is being undertaken. It is the responsibility of the operator to ensure calibration tests are performed on a regular basis.

4.15 Where continuous monitoring for abatement plant is required, it should be carried out as follows:

- All continuous emissions monitoring readings should be on display to appropriately trained operating staff.
- Instruments should be fitted with audible and visual alarms, situated appropriately to warn the operator of abatement plant failure or malfunction.
- The activation of alarms should be automatically recorded.
- All continuous emissions monitors should be operated, maintained and calibrated in accordance with the manufacturers' instructions, which should be made available for inspection by the regulator.
- The relevant maintenance and calibration should be recorded.
- Emission concentrations may be reported as zero when the plant is off and there is no flow from the stack. If required a competent person should confirm that zero is more appropriate than the measured stack concentration if there is no flow.
- Any continuous emissions monitor used should provide reliable data >95% of the operating time, (i.e. availability >95%). A manual or automatic procedure should be in place to detect instrument malfunction and to monitor instrument availability.

Continuous monitoring for particulate matter

4.16 One of the basic issues in obtaining good results from a particulate CEM is to ensure that the instrument is fit for purpose – it must give a stable, reliable response and be able to operate in the long term without the need for maintenance or cleaning.

There are four categories of continuous particulate monitoring instruments used to satisfy regulatory requirements:

Quantitative instrument - may be used to monitor mg/m^3 continuously. Some instruments are capable of being calibrated to a very high standard, such that the uncertainties associated with the data they produce are very small. They also have sophisticated automatic, self-checking data quality-assurance (QA) features built in. Alarm levels can be programmed into the instrument that can detect a given percentage (%) of the emission limit value (ELV).

Qualitative instrument - quantitative CEMs may be used in qualitative mode, where data is still generated in a mg/m3 format but there is further uncertainty in the data. Alarm limits may be set that give an approximate % of the ELV.

Filter leak detector – this instrument monitors for changes in the operation of dust abatement plant (typically a bag filter, measuring trends of plant operation over time). Importantly, the instrument has a QA self-check capability that influences confidence in the data that can be used for simple process control. In terms of alarms, step changes can be seen from analyses for trends over time.

Gross filter failure device – this is a simple instrument that provides an alarm when there is a significant step-change in emissions i.e. rupture of a filter. These instruments tend only to be used on smaller filters since they provide no information to improve plant performance, have no trend output or quality assurance features to provide confidence that they are working correctly.

Differential pressure gauge (also known as a *bag blinding detector*) is also commonly fitted to a bag filter to detect excessive pressure drop across the bags caused by bag blinding. This allows early detection of reduced filter suction and increased fan energy usage. When used on a primary filter a bag blinding detector provides no particle emission detection capability.

Instrument calibration/configuration for particulate CEMs

4.17 Before any calibration or instrument configuration is carried out it is fundamental to carry out checks that ensure the instrument is working properly so that a calibration/configuration test is meaningful and cost-effective. The tests performed to ensure an instrument is prepared for correlation testing against an isokinetic sampling or configuration are referred to as:

- a functionality test of quantitative/qualitative CEMs; **or**
- an instrument health check for filter leak monitors.

The calibration procedure applied then depends on the type of monitoring to be performed by the instrument. The response from quantitative and qualitative CEMs should be correlated to the results of multiple isokinetic gravimetric samples according to the standard reference method (SRM) which is typically EN-13284-1.

The number of samples taken and the quality of the results defines the type of calibration that is applied to the instrument; typically three or five SRM samples are taken.

4.18 If the instrument is to be used as a filter leak monitor then the instrument output range and alarm levels are configured once it has been established that the bag filter is working to specification. This is typically done via engineering inspection of the bag filter to confirm operation, or by checking the output from the leak instrument to ensure there are no abnormal dust peaks on bag cleaning when compared to other bag rows being cleaned.

4.19 The zero of the instrument should also be checked since the calibration line of the filter response curve often uses the zero condition as a calibration point. It is often difficult to create zero dust conditions at the time of calibration so this is often done by reviewing historical data when the plant is known to be off.

4.20 Those instruments operating in qualitative mode but that have not been calibrated with an isokinetic test and filter leak monitors that record trends, are considered to be operating as **indicative monitors**.

Continuous monitoring - odour abatement plant

4.21 Where odour abatement plant is used, continuous monitoring is required, depending upon the type of plant used, as follows:

- In the case of thermal oxidisers or combustion equipment, emissions should be continuously monitored and continuously recorded for carbon monoxide, or the operating temperature may be used as a surrogate measurement. The monitor should be fitted with an audible and visual alarm to activate if the operating temperature falls below 1123K (850˚C) or if the carbon monoxide level exceeds the indicative guide in **paragraph 4.13**.

- In the case of scrubbing equipment, pH or Redox of the liquor and liquor flow should be continuously monitored. All liquid scrubbers should be fitted with an audible and visual alarm to activate if the liquor circulation fails or if the pH or Redox falls outside the operating range established during commissioning testing.

- If a bioscrubber is used, in addition to flow and pH or Redox monitoring, the pressure drop across the scrubber packing should be continuously monitored. The monitor should be fitted with an audible and visual alarm to activate if the pressure drop falls outside the operating range established during commissioning testing.

- The operating levels of the pH, Redox and pressure drop where monitored should be recorded daily.

- The cooling liquid flow of all direct or indirect condensers used for pre-treatment of emissions (including spray tower scrubbers) should be continuously monitored.

Calibration and compliance monitoring

4.22 Calibration and compliance monitoring should meet the following provisions as appropriate:

- Testing of odour abatement plant in accordance with **Table 4.1**, Row 2, should be carried out when the process is in normal operation.

- The destruction efficiency of any odour abatement plant required to meet the provisions in **Table 4.1** should be tested in accordance with the main procedural requirements of BS.EN13725:2003. This testing should be carried out by dynamic olfactometry based upon manual extractive sampling undertaken simultaneously at the inlet and outlet of the odour abatement plant. At least three samples should be taken from both the inlet and outlet.

4.23 For extractive testing the sampling should meet the following requirements:

- For batch processes, where the production operation is complete within, say, 2 hours, then the extractive sampling should take place over a complete cycle of the activity.

4.24 Should the activity either be continuous, or have a batch cycle that is not compatible with the time available for sampling, then the data required should be obtained over a minimum period of 2 hours in total.

- For demonstration of compliance where a CEM is used no daily mean of all 15-minute mean emission concentrations should exceed the specified emission concentration limits during normal operation (excluding start-up and shut-down); **and**

- No 15-minute mean emission concentration should exceed twice the specified emission concentration limits during normal operation (excluding start-up and shut-down).

- For extractive testing, no result of monitoring should exceed the emission limit concentrations specified.

4.25 Exhaust flow rates should be consistent with efficient capture of emissions, good operating practice and meeting the requirements of the legislation relating to the workplace environment.

- The introduction of dilution air to achieve emission concentration limits should not be permitted.

Varying of monitoring frequency

4.26 Where non-continuous quantitative monitoring is required, the frequency may be varied. Where there is consistent compliance with emission limits, regulators may consider reducing the frequency. However, any significant process changes that might have affected the monitored emission should be taken into account in making the decision.

When determining "consistent compliance" factors to consider include:

- the number of abatement plant continuous indicative monitor alarms
- the number and frequency of complaints regarding offensive odour
- how the indicative surrogate performance monitoring of the odour abatement plant reflects actual equipment performance, for example, the operating temperature and carbon monoxide emissions of a thermal oxidiser or combustion equipment are a good surrogate indicator compared to the pressure drop across a biofilter which is a less reliable surrogate indicator
- the variability of monitoring results, for example, results which range from 20 - 45mg/m^3, against an emission limit of 50 mg/m^3 might not qualify for a reduction in monitoring
- the margin between the results and the emission limit, for example, results which range from 88 - 90% destruction when the limit is 90% destruction efficiency might not qualify for a reduction in monitoring.

➢ Any significant process or abatement plant changes which might have affected the destruction efficiency of the equipment should be taken into account.

➢ Where emission limit values for particulate matter are consistently met without the use of abatement plant, the annual monitoring provision for those pollutants should be dispensed with, subject to the caveats of this paragraph.

4.27 The frequency of testing should be increased, for example, as part of the commissioning of new or substantially changed processes, or where emission levels are near to or approach the emission concentration limits.

Consistent compliance should be demonstrated using the results from at least;

- three or more consecutive annual monitoring campaigns; or
- two or more consecutive annual monitoring campaigns supported by continuous monitoring.

4.28 A reduction in monitoring frequency should not be permitted where continuous quantitative or indicative monitoring is required. These types of monitoring are needed to demonstrate at all times when the plant is operating, that either the emission limits are being complied with or that the arrestment equipment is functioning correctly.

Monitoring of unabated releases

4.29 Where emission limit values are consistently met without the use of abatement equipment, the monitoring requirement for those pollutants should be dispensed with subject to the “Varying of monitoring frequency” paragraphs above.

Where monitoring is not in accordance with the main procedural requirements of the relevant standard, deviations should be reported.

Representative sampling

4.30 Whether sampling on a continuous or non-continuous basis, care is needed in the design and location of sampling systems, in order to obtain representative samples for all release points.

- Sampling points on new plant should be designed to comply with the British or equivalent standards (see paragraph 4.2).
- The operator should ensure that relevant stacks or ducts are fitted with facilities for sampling which allow compliance with the sampling standards.

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5. Control techniques

Summary of best available techniques

5.1 The process is largely carried out in process equipment and hence good equipment design, materials handling and spillage prevention can greatly reduce the volumes of air necessary for odour containment by avoiding odour release into the building. However, the containment of potentially odorous emissions is the key to effective control. The effectiveness of containment and treatment measures should finally be judged by the perception of odours in the environment by the regulator. The operator should be advised of odours perceived by the regulator as soon as possible.

5.2 The following are examples of relevant odour control techniques:

- containment of odours within process buildings by good design and extract ventilation
- good housekeeping and raw material handling practices
- containment of odours within process equipment by maintaining material handling and storage facilities leakproof and spillproof as far as possible
- control and minimisation of odours from residual materials, effluent and waste
- containment of strong odour sources and treatment in odour abatement plant where necessary to minimise odorous emissions to meet the provisions of paragraph 4.9.

5.3 **Table 5.1** (overleaf) provides a summary of the best available techniques that can be used to control the process in order to meet the emission limits and provisions in **Section 4**. Provided that it is demonstrated to the satisfaction of the regulator that an equivalent level of control will be achieved, then other techniques may be used.

Table 5.1 - Summary of control techniques		
Release source	**Substance**	**Control techniques**
Raw material and waste storage and handling	Odour	Keep material dry Good house keeping and raw material handling practices
Conditioning and drying processes	Odour	Within process equipment under negative pressure and vented to odour abatement plant as necessary to meet the provisions of paragraph 4.9 Appropriate construction: impervious and easy to clean surfaces
Extracted process air	Odour	Containment of odours within process buildings by good design and extract ventilation Where necessary vent to suitable abatement plant: • biofilters • thermal oxidisers/combustion plant • scrubbers • located to take account of sensitive receptors
Waste gas from process buildings and odour abatement plant	Odour	Final dispersion to ensure no offensive odour at sensitive receptors
Waste gas from odour abatement plant	Sulphur oxides	Limit sulphur in fuel
Waste gas from odour abatement plant	Carbon monoxide	Good combustion
Waste gases from cell expansion operations	Volatile organic compounds	Avoid the use of the VOCs Abatement by recovery using adsorption and condensation preferred
Waste gases from flavour addition and associated drying operations	Volatile organic compounds	Minimise or avoid the use of VOCs in the flavour Abatement by thermal treatment, biofiltration or recovery using adsorption and condensation
Raw material storage and handling	Particulate matter	Potentially dusty materials should be stored in buildings or appropriate containers
Cutting, blending, mixing, forming and pneumatic material transfer	Particulate matter	Process control Spillage management Dust abatement: • bag filters • cartridge filters

Techniques to control emissions from contained sources

Odour control

5.4 Emissions from the process operations covered by this note comprise odours of mixed chemical species. The main principles for preventing odour emissions are:

- containment of the odours in the process equipment;
- raw material handling operations (as detailed below); **and**
- final treatment by abatement of odour emissions where necessary to meet the provisions of **paragraph 4.9.**

5.5 Where containment is used to prevent odours this is achieved by either carrying out operations with potential releases within enclosed equipment under slight negative pressure, or, as in the case of fugitive emissions, by controlling by building extract ventilation.

- Ventilation should be provided to maintain an adequate negative pressure within the process equipment (including tanks and vessels for holding condensate) to contain process releases within the equipment during process operation. The required ventilation rate will depend upon many factors (such as environmental conditions, process conditions, raw material quality, effectiveness of process containment). Containment of emissions within the process equipment should prevent fugitive releases.

- Ventilation equipment should be vented to odour abatement plant as necessary to meet the provisions of **Table 4.1**.

- Suitable odour abatement plant should be provided and operated at all times where necessary to meet the provisions of **Section 4** of this note. Examples of the type of abatement plant which are suitable include biofilters, high efficiency biological scrubbers, thermal incinerators and other forms of combustion plant. In the case of tobacco processes, adsorption equipment is not anticipated to offer adequate odour removal due to the types of chemical species in the odour and the risk of odour breakthrough and re-entrainment.

- The presence of water vapour in the emissions from processes can adversely affect the operation of the odour abatement plant. The water vapour will usually condense and this can lead to corrosion of materials of construction. Also in the case of scrubbing equipment, the condensation of significant volumes of water vapour will result in continuous liquid overflow and dilution of the scrubbing liquor. In circumstances where odorous emissions are saturated and wet scrubbing systems are used, the emissions may need to be condensed (for example by the use of a spray tower or quench scrubber) prior to odour treatment of the non-condensable gases.

5.6 Where odour abatement plant is required it needs to be optimised to meet the odour destruction efficiency provisions of **Table 4.1**. Depending upon the type of abatement plant used, this optimisation will include the following:

- In the case of thermal oxidisers or combustion equipment the operating temperature of the system will need to be maintained above 1123K (850^{o}C). In the case of boilers, care is needed in their use for odour abatement as the operating temperature and residence time may not have been designed for odour abatement and there is the potential for quenching in the boiler. In addition, it may be necessary to establish a minimum firing rate for the boiler to ensure that the boiler conditions are always optimised for odour removal. The measurement of odour abatement efficiency of the boiler can be used to demonstrate the correct operating parameters of the boiler.

- In the case of scrubbing equipment, it is likely that multi-stage scrubbing will be necessary to meet the odour destruction efficiency provisions of **Table 4.1**. In order to optimise the performance of the scrubber, it is important to ensure that it is well designed (adequate gas/liquid contact), well maintained, that the odours are sufficiently reactive with the scrubbing liquor to remove the odour and also that the reaction products do not themselves produce a volatile odour. In addition, additives to the liquor need to be automatically dosed with control by pH/Redox (over-dosing can lead to secondary odours from the scrubber associated with the chemical reagent).

- Mist eliminators should be fitted where droplet emissions occur and, in relation to new or replacement scrubbing plant, where there is a potential for such occurrence.

5.7 The use of odour masking agents and counteractants should not be permitted (other than as a scrubber liquor additive).

Particulate matter

5.8 The main principles for preventing emissions of particulate matter are containment and, where necessary, abatement.

- Emissions of particulate matter from blenders, cutters, mixers, makers and pneumatic material transfer systems should be contained, extracted and arrested if necessary to meet the visible emission provisions or the limits described in **Table 4.1** for particulate matter. In the case of emissions which are both odorous and contain particulate matter, it may be necessary to treat the releases from the particulate matter abatement plant to remove the odour before final dispersion of residual odour.

- The methods of removal of collected particulate matter from abatement plant should be undertaken carefully to avoid re-entrainment of dust. The discharge from particulate matter abatement plant should be to screw auger, enclosed containers or enclosed conveyors. The potential for blockage of the rotary valve, discharge point or hopper should be continuously monitored (for example by the use of a rotation sensor on the rotary seal or a level indicator in the hopper). These indicative monitors should be fitted with an audible and/or visual alarm to activate when blockages occur. Alternatively the operator may elect to interlock the monitor to isolate the process equipment in case of potential blockage.

Volatile organic compounds

5.9 Operations using VOCs should be undertaken in enclosed or covered vessels to minimise emissions.

- Where possible, flavour addition should be carried out using solvents of low volatility, and extracted to general abatement equipment.

- Cell expansion should be carried out in a fully enclosed system to the provisions of **Table 4.1**, Row 4. Demonstration of the efficiency will usually involve the preparation of a Solvent Mass Balance. This should detail the total mass of organic solvent returned to the day tank/bulk tank and the mass of solvent delivered to the process. This should be measured for each batch operation or at an agreed frequency for semi-continuous processes. In calculating the solvent mass balance, the efficiency measure should not include any losses due to emergency vent activation - in this case the loss should not be included but the activation of the emergency vent should be recorded in accordance with **paragraph 4.6**.

- Recovered solvents should not be burned unless the combustion unit is designed for the purpose and meets the requirements of the Waste Incineration Directive (EC/2000/76).

- VOCs with the risk phrase R45 (may cause cancer), R46 (may cause heritable genetic damage), R49 (may cause cancer by inhalation), R60 (may impair fertility) or R61 (may cause harm to the unborn child) should not be used in flavours or for cell expansion.

- CFCs or HCFCs should not be used for cell expansion.

Techniques to control fugitive emissions

Materials handling

5.10 Adequate provision should be made for the containment of liquid and solid spillages.

- All spillages should be cleared as soon as possible.
- Dry sweeping of dusty spillages should not be permitted in circumstances where it may lead to the deposition of dust outside the site boundary.
- All dusty or potentially dusty materials should be stored in covered containers, sealed bags or purpose built silos.
- The storage of raw materials should be permitted inside processing buildings provided that adequate steps are taken to prevent entrainment of particulate matter outside the building, for example by the use of plastic strip curtains on building access points.
- Where necessary, in order to minimise emissions of dust, extraction should be provided from transfer points to abatement plant - for example, a bag filter.
- All tanks for liquid material storage should be fitted with level indicators or high level alarms to warn of potential overfilling (it may be acceptable to rely upon regular dipping of the tanks associated with a documented material transfer protocol). All such tanks should be vented to odour abatement equipment where necessary to meet the provisions of **paragraph 4.6**.

Odour response procedure (ORP)

5.11 Where abatement equipment is fitted, the operator should prepare an odour response procedure (ORP) as outlined in **Appendix 1**. This is a summary of the foreseeable situations which may compromise the ability to prevent and/or minimise odorous releases from the process and the actions to be taken to minimise the impact. It is intended to be used by operational staff on a day-to-day basis and should detail the person responsible for initiating the action.

- The ORP should include a list of essential spares for any odour abatement equipment that is needed. The equipment manufacturer should recommend which spares are subject to wear and foreseeable failure and are critical for the correct operation of the odour abatement equipment (such as pumps, nozzles etc.) and these should be held on site. It may be acceptable for certain spares to be available on guaranteed short delivery if the absence of a supply at the site would not lead to complete failure of the odour abatement equipment or to offensive odours beyond the site boundary.

- The ORP should include analysis of actions in the case of any abatement plant breakdown or malfunction. Immediate arrangements should be made to divert odour streams to other suitable abatement plant. Emergency standby arrangements should be detailed in the ORP.

Air quality

Dispersion & dilution

5.12 Pollutants that are emitted via a stack require sufficient dispersion and dilution in the atmosphere to ensure that they ground at concentrations that are deemed harmless. This is the basis upon which stack heights are calculated using HMIP Technical Guidance Note (Dispersion) D1. The stack height so obtained is adjusted to take into account local meteorological data, local topography, nearby emissions and the influence of plant structure.

The calculation procedure of D1 is usually used to calculate the required stack height but alternative dispersion models may be used in agreement with the regulator. An operator may choose to meet tighter emission limits in order to reduce the required stack height.

5.13 Where an emission consists purely of air and particulate matter, (i.e. no products of combustion or any other gaseous pollutants are emitted) the above provisions relating to stack height calculation for the purpose of dispersion and dilution should not normally be applied. Revised stack height calculations should not be required as a result of publication of this revision of the PG note, unless it is considered necessary because of a breach or serious risk of breach of an EC Directive limit value or because it is clear from the detailed review and assessment work that the permitted process itself is a significant contributor to the problem.

5.14 Where offensive odour is likely outside the process site boundary the assessment of stack or vent height should take into account the need to render harmless residual offensive odour.

Ambient air quality management

5.15 In areas where air quality standards or objectives are being breached or are in serious risk of breach and it is clear from the detailed review and assessment work under Local Air Quality Management that the permitted process itself is a significant contributor to the problem, it may be necessary to impose tighter emission limits. If the standard that is in danger of being exceeded is not an EC Directive requirement, then industry is not expected to go beyond BAT to meet it. Decisions should be taken in the context of a local authority's Local Air Quality Management action plan. For example, where a permitted process is only responsible to a very small extent for an air quality problem, the authority should not unduly penalise the operator of the process by requiring disproportionate emissions reductions. Paragraph 59 of the Air Quality Strategy 2007 [Volume 1] gives the following advice:

"...In drawing up action plans, local authority environmental health/pollution teams are expected to engage local authority officers across different departments, particularly, land-use and transport planners to ensure the actions are supported by all parts of the authority. In addition, engagement with the wider panorama of relevant stakeholders, including the public, is required to ensure action plans are fit-for-purpose in addressing air quality issues. It is vital that all those organisations, groups and individuals that have an impact upon local air quality, buy-in and work towards objectives of an adopted action plan."

Stacks, vents and process exhausts

5.16 Liquid condensation on internal surfaces of stacks and exhaust ducts might lead to corrosion and ductwork failure or to droplet emission. Adequate insulation will minimise the cooling of waste gases and prevent liquid condensation by keeping the temperature of the exhaust gases above the dewpoint. A leak in a stack/vent and the associated ductwork, or a build up of material on the internal surfaces may affect dispersion:

- Flues and ductwork should be cleaned to prevent accumulation of materials, as part of the routine maintenance programme.

5.17 When dispersion of pollutants discharged from the stack (or vent) is necessary, the target exit velocity should be 15m/s under normal operating conditions, however, lower velocities than 15m/s are acceptable provided adequate dispersion and dilution is achieved (see also the paragraph below regarding wet plumes). In order to ensure dispersion is not impaired by either low exit velocity at the point of discharge, or deflection of the discharge, a cap, or other restriction, should not be used at the stack exit. However, a cone may sometimes be useful to increase the exit velocity to achieve greater dispersion.

5.18 An exception to the previous paragraph is where wet arrestment is used as the abatement. Unacceptable emissions of droplets could occur from such plant where the linear velocity in the stack exceeds 9m/s.

5.19 To reduce the potential of droplet emissions a mist eliminator should be used. Where a linear velocity of 9m/s is exceeded in existing plant consideration should be given to reducing this velocity as far as practicable to ensure such droplet entrainment and fall out does not happen.

Management

Management techniques

5.20 Important elements for effective control of emissions include:

- proper management, supervision and training for process operations;
- proper use of equipment;
- effective preventative maintenance on all plant and equipment concerned with the control of emissions to the air; **and**
- ensuring that spares and consumables - in particular, those subject to continual wear – are held on site, or available at short notice from guaranteed local suppliers, so that plant breakdowns can be rectified rapidly. This is important with respect to arrestment plant and other necessary environmental controls. It is useful to have an audited list of essential items.

Appropriate management systems

5.21 Effective management is central to environmental performance; it is an important component of BAT and of achieving compliance with permit conditions. It requires a commitment to establishing objectives, setting targets, measuring progress and revising the objectives according to results. This includes managing risks under normal operating conditions and in accidents and emergencies.

It is therefore desirable that installations put in place some form of structured environmental management approach, whether by adopting published standards (ISO 14001 or the EU Eco Management and Audit Scheme [EMAS]) or by setting up an environmental management system (EMS) tailored to the nature and size of the particular process. Operators may also find that an EMS will help identify business savings.

5.22 Regulators should use their discretion, in consultation with individual operators, in agreeing the appropriate level of environmental management. Simple systems which ensure that LAPPC considerations are taken account of in the day-to-day running of a process may well suffice, especially for small and medium-sized enterprises. Regulators are urged to encourage operators to have an EMS for all their activities, but it is outside the legal scope of an LAPPC permit to require an EMS for purposes other than LAPPC compliance. For further information/advice on EMS refer to the appropriate chapter of the appropriate Guidance Manual for England and Wales, Scotland and Northern Ireland.

Training

5.23 Staff at all levels need the necessary training and instruction in their duties relating to control of the process and emissions to air. In order to minimise risk of emissions, particular emphasis should be given to control procedures during start-up, shut down and abnormal conditions. Training may often sensibly be addressed in the EMS referred to above.

- All staff whose functions could impact on air emissions from the activity should receive appropriate training on those functions. This should include:
  - awareness of their responsibilities under the permit;
  - steps that are necessary to minimise emissions during start-up and shutdown;
  - actions to take when there are abnormal conditions, or accidents or spillages that could, if not controlled, result in emissions.
- The operator should maintain a statement of training requirements for each post with the above mentioned functions and keep a record of the training received by each person. These documents should be made available to the regulator on request.

Maintenance

5.24 Effective preventative maintenance plays a key part in achieving compliance with emission limits and other provisions. All aspects of the process including all plant, buildings and the equipment concerned with the control of emissions to air should be properly maintained. In particular:

- The operator should have the following available for inspection by the regulator:
  - a written maintenance programme for all pollution control equipment; **and**
  - a record of maintenance that has been undertaken.

6. Summary of changes

The main changes to this note, with the reasons for the change, are summarised in **Table 6.1**. Minor changes that will not impact on the permit conditions e.g. slight alterations to the Process Description have not been recorded.

Table 6.1 - Summary of changes			
Section/ paragraph/row	**Change**	**Reason**	**Comment**
Section 1: Introduction			
	Simplification of text	Make note clearer	
	Addition of links	Change to electronic format	Removes need for extensive footnotes/references
Paragraphs 1.6 & 1.7	Introductory text to the simplified permitting regime	New to Part B	
Section 4: Emission limits, monitoring and other provisions			
Whole section	Used to be Section 5 in previous note	Section 4 in previous note deleted and potential emissions added into Section 3.	
Table 4.1 Rows 2 & 3	Clarification of continuous monitoring requirements and periodic extractive testing	Clarify what is meant by “indicative monitoring”	Reduce costs of monitoring by reducing periodic testing to 3 yearly where higher specification CEMs are in place
Paragraphs 4.8 & 4.9 Visible Emissions	Revised text describing approach to take to visible emissions.	Allows more flexibility in managing visible emissions	
Section 5: Control techniques			
	Used to be Section 6 in previous note	Section 4 in previous note deleted leading to re-numbering of sections	
Air quality	Clarification of exhaust velocity requirements	Make note clearer	
Appendices 1 & 2	Inclusion of a new Appendix detailing a model simplified permit	Simplification of permitting process	

7. Further information

Sustainable consumption and production (SCP)

Both business and the environment can benefit from adopting sustainable consumption and production practices. Estimates of potential business savings include:

- £6.4 billion a year UK business savings from resource efficiency measures that cost little or nothing;
- 2% of annual profit lost through inefficient management of energy, water and waste;
- 4% of turnover is spent on waste.

When making arrangement to comply with permit conditions, operators are strongly advised to use the opportunity to look into what other steps they may be able to take, for example, having regard to the efficient use of auxiliary fuels, such as gas and electricity. Regulators may be willing to provide assistance and ideas, although cannot be expected to act as unpaid consultants.

Health and safety

Operators of installations must protect people at work as well as the environment:

- requirements of a permit should not put at risk the health, safety or welfare of people at work or those who may be harmed by the work activity;
- equally, the permit must not contain conditions whose only purpose is to secure the health of people at work. That is the job of the health and safety enforcing authorities.

Where emission limits quoted in this guidance conflict with health and safety limits, the tighter limit should prevail because:

- emission limits under the relevant environmental legislation relate to the concentration of pollutant released into the air from prescribed activities;
- exposure limits under health and safety legislation relate to the concentration of pollutant in the air breathed by workers;
- these limits may differ since they are set according to different criteria. It will normally be quite appropriate to have different standards for the same pollutant, but in some cases they may be in conflict (for example, where air discharged from a process is breathed by workers). In such cases, the tighter limit should be applied to prevent a relaxation of control.

Further advice on responding to incidents

The UK Environment Agencies have published guidance on producing an incident response plan to deal with environmental incidents. Only those aspects relating to air emissions can be subject to regulation via a Part B (Part C in NI) permit, but regulators may nonetheless wish to informally draw the attention of all appropriate operators to the guidance.

It is not envisaged that regulators will often want to include conditions, in addition to those advised in this PG note, specifying particular incident response arrangements aimed at minimising air emissions. Regulators should decide this on a case-by-case basis. In accordance with BAT, any such conditions should be proportionate to the risk, including the potential for harm from air emissions if an incident were to occur. Account should therefore be taken of matters such as the amount and type of materials held on site which might be affected by an incident, the likelihood of an incident occurring, the sensitivity of the location of the installation, and the cost of producing any plans and taking any additional measures.

Appendix 1 - Model Permit

This Appendix contains a model permit for tobacco processing installations – see [insert relevant para from introduction] of this note and paragraph 3.6 of the General Guidance Manual on Policy and Procedures.

Notes:

- text in the model permit written in italics is advice to regulators.
- text in the model permit in [square brackets] offers choice to regulators or indicates where information needs to be inserted from the application;
- text bracketed with asterisks (eg *Alarms shall be tested at least once a week*.) may be omitted by a regulator where the past performance of the plant gives the local authority sufficient reassurance about operator compliance – "earned recognition";
- the model permit has been drafted for local authorities in England and Wales. Regulators in Scotland and Northern Ireland will need to amend the legal heading and, where appropriate, references to 'Council';
- references to 'installation' will need to be substituted with 'mobile plant' in relevant cases, and other amendments made accordingly;
- the purpose of the activity description is to set down the main characteristics of the activity, including any directly associated activities, so it is clear to all concerned what is being authorised by the permit and therefore what changes would need further approval. Regulators are advised to include a description of any key items of abatement and monitoring equipment the operator intends to use or is using;
- it should normally be sufficient for records relating to simplified permits to be kept for no more than [24] months. Where, however, as a result of a 'low risk' rating, inspections are undertaken less often, regulators may want to specify a period which ensures the records are available at the next inspection.

[ ] COUNCIL
POLLUTION PREVENTION AND CONTROL ACT 1999
Environmental Permitting Regulations 2010 (as amended)

Permit ref. no:

Name and address of person (A) authorised to operate the installation ('the operator'): **Registered number and office of company:** (if appropriate)

Address of permitted installation (B)

The installation boundary and key items of equipment mentioned in permit conditions are shown on the plans attached to this permit.

Activity description

Conditions

The operator (A) is authorised to operate the activity1 at the installation (B) subject to the following conditions.

Emissions

1. No visible particulate matter shall be emitted beyond the installation boundary.

Buildings, ventilation

2. Buildings containing processing operations shall:

   - prevent the uncontrolled release of air from raw materials receipt, processing and storage.

Odour abatement plant *(delete conditions 3 & 4 if no odour abatement plant serves the activity)*

3. The operator shall ensure that:

   - collected air is discharged through odour abatement plant;

4. The odour abatement equipment shall be inspected not less than once a day for at least the following:

   - leaks or blockages in air handling equipment, ductwork and abatement equipment;
   - continuous monitors for abatement equipment

Odour response plan

5. The operator shall have a written odour response plan.

Bulk, loose, dry material - storage and loading

6. Dusty materials (including dusty wastes) shall only be stored in [*specify storage locations*] as detailed on the plan attached to this permit and their storage and transfer shall be subject to suppression and management techniques to minimise dust emissions. No potentially dusty materials (including wastes) or finished products shall leave the site other than by use of [*specify transport type and dust control technique*].

Monitoring provisions

7. The emission requirements and methods and frequency of monitoring set out in Table 1 shall be complied with. Sampling shall be representative.

8. *Where continuous monitors are fitted to show compliance with a numerical limit in Table 1:* All continuous monitors fitted to show compliance with the permit shall be fitted with a [visible] [audible] alarm warning of abatement failure or malfunction. They shall [activate when emissions reach [75%] of the relevant emission limit in **Table 1** and] record automatically each activation. *Alarms shall be tested at least once a week.*

9. Corrective action shall be taken immediately if any periodic monitoring result exceeds a limit in **Table 1**, or if there is a malfunction or breakdown of any equipment which might increase emissions. Monitoring shall be undertaken or repeated as soon as possible thereafter and a brief record shall be kept of the main actions taken.

[1] listed in [ ] in Part 2 of Schedule 1 to the Environmental Permitting Regulations

10. All plant and equipment capable of causing, or preventing, emissions and all monitoring devices shall be calibrated and maintained in accordance with the manufacturer's instructions. *Records shall be kept of such maintenance*.

11. The operator shall, in the case of abnormal emissions, inform the regulator without delay if there is an emission likely to have an effect on the local community.

Records and training

12. Written or computer records of all tests and monitoring shall be kept by the operator for at least [ ] months. They shall be made available for examination by the Regulator. *Records shall be kept of operator inspections, including those for visible and odorous emissions.*

13. Staff at all levels shall receive the necessary training and instruction to enable them to comply with the conditions of this permit. *Records shall be kept of relevant training undertaken*.

14. The following two conditions are not needed for PPC permits which transferred automatically into the environmental permitting regime by virtue of regulation 69(6) of the 2007 Regulations and regulation 108(4) of the 2010 Regulations. Where permits are issued on or after 6 April 2008 the conditions will not automatically apply and need specific inclusion in the permit where required.

Best available techniques

15. The best available techniques shall be used to prevent or, where that is not practicable, reduce emissions from the installation in relation to any aspect of the operation of the installation which is not regulated by any other condition of this permit.

16. If the operator proposes to make a change in operation of the installation, he must, at least 14 days before making the change, notify the regulator in writing. The notification must contain a description of the proposed change in operation. It is not necessary to make such a notification if an application to vary this permit has been made and the application contains a description of the proposed change. In this condition 'change in operation' means a change in the nature or functioning, or an extension, of the installation, which may have consequences for the environment.

Permit writer to delete rows that do not apply

Table 1 - Emission limits, monitoring and other provisions					
Row	**Substance**	**Source**	**Emission limits/provisions**	**Type of monitoring**	**Monitoring frequency**
1.	Odour	Contained process releases	Any odour abatement plant installed should have an odour removal efficiency of not less than 90% (see note f, end of table).	Determination by manual extractive sampling and analysis by dynamic olfactometry (see note 1)	On installation of new / replacement odour abatement equipment (see note 1)
Note 1 - when offensive odours are detected beyond the process boundary or complaints are received and there is no obvious cause of odour release then the operator shall check the odour abatement plant performance using **Table** and check the process operational controls. If notified by the regulator, odour removal efficiencies shall be re-tested.					
2	Particulate matter	Emissions from drying and conditioning processes where emissions are vented to cyclones and the flow exceeds 100m^3/min	50 mg/m^3	**Filter leak monitor** • provide visual alarms • record trend output and alarms **plus** • 3 yearly extractive test	• continuous **plus** • 3 yearly extractive test
3	Particulate matter	Emissions from contained process sources (other than those covered in Row 2 above) and the flow exceeds 100m^3/min	20 mg/m^3	**Filter leak monitor** • provide visual alarms • record trend output and alarms **plus** • 3 yearly extractive test	• continuous **plus** • 3 yearly extractive test

4	VOCs	Emissions from cell expansion involving the use of VOCs	The operator should record the solvent recovery efficiency of the cell expansion process (see note g). Where the process is batch, a recovery efficiency of at least 95% should be achieved, for other process types the recovery efficiency should be at least 85%.	Where cell expansion operations are carried out using VOCs, then the cooling liquid flow of all direct and indirect condensers used for solvent recovery should be continuously monitored.	
5	Visible smoke	Combustion processes used for abatement of odour should be free from visible smoke	No visible smoke	Visual observations	*on start-up and on at least two more occasions during the working day*
6	Droplets, persistent visible emissions	All emissions to air (except steam and condensed water vapour)	No droplets, no persistent visible emissions	Visual observations	*on start-up and on at least two more occasions during the working day*

Notes:

a) The reference conditions for limits in Table 1 are: [273.1K, 101.3kPa], without correction for water vapour content, unless stated otherwise.

b) All periodic monitoring shall be representative, and shall use standard methods.

c) *All periodic monitoring results shall be checked by the operator on receipt and sent to the Council within 8 weeks of the monitoring being undertaken.*

d) The [ ] emission limits do not apply during start-up and shut down. All emissions shall be kept to a minimum during these periods.

e) Abatement for mixed intensity odour should have an emission limit calculated using mass flow of odour units.

f) Where the inlet odour concentrations are very low and the 90% destruction efficiency is difficult to demonstrate due to measurement reproducibility and equipment efficiency at low concentrations, the final discharge to air should contain less than 500 odour units/m^3.

g) Demonstration of the efficiency will usually involve the preparation of a Solvent Mass Balance.

Permit writer to amend, delete or add in rows as required

Table 2 - Odour abatement plant - Indicative guide provisions for monitoring			
Type of Odour abatement plant	**Indicative Guide Substance and Value**	**Type of monitoring**	**Monitoring frequency**
Thermal oxidiser or combustion plant use as odour abatement plant	Emissions of carbon monoxide (CO) at 100mg/m^3 expressed as a 30minute mean at: • 273K and 101.3Pa or • 850^oC	Carbon monoxide – recording, indicative monitor with visible and audible alarms Temperature - monitor and audible and visual alarms	Continuous
Scrubbing equipment	Liquor flow	Monitor and alarms (audible and visual)	• Continuous • Record daily
	pH or Redox potentials established during commissioning	Monitor, record and alarms (audible and visual)	• Continuous • Record daily
Bioscrubber additionally needs	Pressure drop across scrubber packing established during commissioning	Monitor and alarms (audible and visual)	• Continuous • Record daily
Notes 1. Testing of odour abatement plant should be carried out when plant is operating normally. 2. Destruction efficiency testing requires simultaneous sampling at inlet and outlet of abatement plant.			

Right to appeal

You have the right of appeal against this permit within 6 months of the date of the decision. The Council can tell you how to appeal [*or supply details with the permit*]. You will normally be expected to pay your own expenses during an appeal.

You will be liable for prosecution if you fail to comply with the conditions of this permit. If found guilty, the maximum penalty for each offence if prosecuted in a Magistrates Court is £50,000 and/or 6 months imprisonment. In a Crown Court it is an unlimited fine and/or 5 years imprisonment.

Our enforcement of your permit will be in accordance with the Regulators' Compliance Code

Appendix 2 - Application form for a simple permit to operate a tobacco process

Application for a permit for a tobacco process

Local Authority Pollution Prevention and Control
Pollution Prevention and Control Act, 1999
Environmental Permitting (England and Wales) Regulations 2010

Introduction

When to use this form

Use this form if you are applying for a permit to a Local Authority to operate a tobacco process installation as defined in Schedule 1 to the Environmental Permitting Regulations.

The appropriate fee must be enclosed with the application to enable it to be processed further. When complete, send the form and the fee and any additional information to:

[Insert local authority address]

If you need help and advice

We have made the application form as straightforward as possible, but please get in touch with us at the local authority address given above if you need any advice on how to set out the information we need.

For the purposes of Section G of the form, a relevant offence is any conviction for an offence relating to the environment or environmental regulation.

For Local Authority use		
Application reference	Officer reference	Date received

LAPPC application form - to be completed by the operator

A The basics

A1 Name and address of the installation

Postcode: Telephone:

A2 Details of any existing environmental permit or consent

(for waste operations, include planning permission for the site, plus established use certificates, a certificate of lawful existing use, or evidence why the General Permitted Development Order applies.)

A3 Operator details

(The 'operator' = the person who it is proposed will have control over the installation in accordance with the permit (if granted).)

Name: Trading name, if different:
Registered office address: Principal office address, if different:
Company registration number:

A4 Any holding company?

Is the operator a subsidiary of a holding company within the meaning of section 1159 of the Companies Act 2006? If "yes" please fill in details of the ultimate holding company.

☐ Yes ☐ No

Name: Trading name, if different:
Registered office address: Principal office address, if different:
Company registration number:

A5 Who can we contact about your application?

It will help to have someone who we can contact directly with any questions about your application. The person you name should have the authority to act on behalf of the operator - This can be an agent or consultant.

Name and position: _____ Telephone: _____ Email: _____

B The installation

B1 Are you a tobacco processing installation?

☐ Yes ☐ No

B2 Why is the application being made?

☐ new installation

☐ change to existing installation means it now needs a permit

B3 Site maps – please provide:

A location map with a red line round the boundary of the installation

Document reference: _____

A site plan or plans showing where all the relevant activities are on site:

a) where the processing plant will be installed

b) the areas and buildings/structures designated for materials and waste storage and the type of storage

c) the conveyors and transfer points

d) any directly associated activities or waste operations.

To save applying for permit variations, you can also show where on site you might want to use for storage etc in the future.

Document reference: _____

B4 Are there any sites of special scientific interest (SSSIs) or European protected sites nearer than any of the following distances to the proposed installation?

2km - for an installation which includes Part B combustion or incineration (not crematoria)

☐ Yes ☐ No

0.5km for all other Part B activities

☐ Yes ☐ No

If 'yes', is the installation likely to have a significant effect on the special scientific interest or European protected sites?

☐ Yes ☐ No

If 'yes', please write on a separate sheet or enclose a relevant document explaining what the implications are for the purposes of the Conservation (Natural Habitats etc) Regulations 1994 (see appendix 2 of Annex XVII of the general guidance manual)

Document reference: _____

B5 Will emissions from the activity potentially have significant environmental effects (including nuisance)?

☐ Yes ☐ No

If 'yes', please list the potential significant local environmental effects (including nuisance) of the foreseeable emissions on a separate document.

Document reference: _____

If 'yes', please enclose a copy of any environmental impact assessment which has been carried out for the installation under planning legislation or for any other purpose.

Document reference: _____

C The details

C1 Does your installation have odour abatement equipment, with external discharge points? *[informs conditions 4 &5]*

☐ Yes ☐ No

If yes, what kind of odour abatement equipment is in place?

a) thermal oxidiser ☐ *(tick all that apply)*
b) other combustion equipment ☐
c) chemical scrubber ☐
d) bio-scrubber ☐
e) other, please describe:_____

C2 Does your installation have particulate abatement equipment, with external discharge points? *[informs Table 1]*

☐ Yes ☐ No

If yes, is there an airflow of :

a) under 100m^3/minute: ☐ *(tick all that apply)*
b) over 100m^3/minute ☐

Please mark all external emissions points on a plan to be provided with the application form

Document reference: _____

C3 Do you have continuous emissions monitors to show compliance with a numerical limit in Table 1 of the simple permit? *[informs Table 1, condition 9]*

☐ Yes ☐ No

If yes, do the continuous emissions monitors have alarms which are:

a) visible? ☐ *(tick all that apply)*
b) audible? ☐
c) alarm activation recorded automatically? ☐
d) is a trigger level set? ☐ Yes ☐ No

If so, at what percentage of the emission limit is the value set? ……%

C4 Are any dusty materials/waste stored externally? *[informs condition 7]*

If no, go to C6. ☐ Yes ☐ No

If yes, what facilities will be provided to store any dusty materials/waste?:

a) storage bay with suppression ☐ *(tick all that apply)*
b) fully-enclosed stores ☐
c) other please – specify: _____

If yes, how will any dusty material/waste be transferred within the installation?
[informs BAT]

a) fully-enclosed transport ☐ *(tick all that apply)*
b) fully-enclosed conveyor ☐
c) pneumatic handling system ☐
d) sheeted handling system ☐
e) baggage ☐
f) other please specify_____

C6 How will potentially dusty materials (including any raw materials, finished products and waste), arrive at or leave the site? *[informs condition 7]*

	Raw materials	**Finished Products**	**Waste**
Road	☐	☐	☐
Rail	☐	☐	☐
Other	☐ _____	☐ _____	☐ _____

C7 Do you have environmental management procedures and policy?

☐ Yes ☐ No

D Anything else?

Please tell us of anything else you would like us to take account of:

Document reference: _____

E Application fee

You must enclose the relevant fee with your application.

If your application is successful you will also have to pay an annual subsistence charge, so please say who you want invoices to be sent to.

Name and position: Telephone: Email:

F Protection of information

F1 Any confidential or national security information in your application?

If there is any information in your application you think should be kept off the public register for confidentiality or national security reasons, please say what and why. General guidance manual chapter 8 advises on what may be excluded. *(Do not include any national security information in your application. Send it, plus the omitted information, to the Secretary of State or Welsh Ministers who will decide what, if anything, can be made public.)*

Document reference : _____

F2 Please note: data protection

The information you give will be used by the Council to process your application. It will be placed on the relevant public register and used to monitor compliance with the permit conditions. We may also use and or disclose any of the information you give us in order to:

- consult with the public, public bodies and other organisations;
- carry out statistical analysis, research and development on environmental issues;
- provide public register information to enquirers;
- make sure you keep to the conditions of your permit and deal with any matters relating to your permit;
- investigate possible breaches of environmental law and take any resulting action;
- prevent breaches of environmental law;
- offer you documents or services relating to environmental matters;
- respond to requests for information under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004; (if the Data Protection Act allows)
- assess customer service satisfaction and improve our service.

We may pass on the information to agents/representatives who we ask to do any of these things on our behalf.

F3 Please note: it is an offence to provide false information

It is an offence under regulation 38 of the EP Regulations, for the purpose of obtaining a permit (for yourself or anyone else), to:

- make a false statement which you know to be false or misleading in a material particular;
- recklessly make a statement which is false or misleading in a material particular;
- intentionally to make a false entry in any record required to be kept under any environmental permit condition;
- with intent to deceive, to forge or use a document issued or required for any purpose under any environmental permit condition.

If you make a false statement:

- we may prosecute you; **and**
- if you are convicted, you are liable to a fine or imprisonment (or both).

G Declarations A and B for signing, please

These declarations should be signed by the person listed in answer to question A3. Where more than one person is identified as the operator, all parties should sign. Where a company or other body corporate is the operator, an authorised person should sign and provide evidence of authority from the board.

Declaration A: I/We certify

EITHER - As evidence of my/our competence to operate this installation in accordance with the EP Regulations, no offences have been committed in the previous five years relating to the environment or environmental regulation.

OR - The following offences have been committed in the previous five years which may be relevant to my/our competence to operating this installation in accordance with the regulations:

Signature: _____ Name: _____

Position: _____ Date: _____

Declaration B:

I/We certify that the information in this application is correct. I/We apply for a permit in respect of the particulars described in this application (including the listed supporting documentation) I/we have supplied.

(Please note that each individual operator must sign the declaration themselves, even if an agent is acting on their behalf.)

Signature: _____ Name: _____

Position: _____ Date: _____

Signature: _____ Name: _____

Position: _____ Date: _____

Signature: _____ Name: _____

Position: _____ Date: _____

Appendix 3 - Guidance on the preparation of an odour response procedure

What is an odour response procedure?

An odour response procedure is a summary, provided by the operator, of the foreseeable situations which may compromise his ability to prevent and/or minimise odorous releases from the process and the actions to be taken to minimise the impact. It is intended to be used by operational staff on a day-to-day basis and should detail the person responsible for initiating the action.

The procedure is intended primarily to document foreseeable events which are outside of the control of the operator and those that are preventable by maintenance and operational control (for example pump failure, biofilter compaction or filter breakthrough). The procedure should include a maintenance programme for all odour abatement equipment and other odour containment measures (such as building structure, ventilation plant).

What is the format for the odour response procedure?

The odour response procedure should be a written document which is available on-site and should be submitted to the regulator. The regulator may wish to set conditions in the permit/authorisation which reflect the undertakings given in the procedure (for example maximum abatement plant by-pass times, reduced throughput etc).

What should be included in the odour response procedure?

There are four main reasons for releases which may lead to emissions of offensive odour which are:

1. Changes in process conditions leading to more odour generation or a change in the odour characteristics.

2. Conditions which result in fugitive releases due to reduced odour containment.

3. Failures or reduced performance of odour abatement equipment.

4. Factors affecting the dispersion between the source and the receptor.

The occurrence of points 2 and 3 above can be limited by the production of, and compliance with, an effective plant and building maintenance programme. Examples of other issues which should be considered in each of these categories are given in **Table A**.

In order to prepare an assessment of possible abnormal conditions and the options for mitigation of the odour, the operator will need to consider:

- the activity which produces the odour and the point of odour release;
- possible process or control failures or abnormal situations;
- potential outcome of a failure in respect of the likely odour impact on local sensitive receptors;
- what actions are to be taken to mitigate the effect of the odour release and details of the persons responsible for the actions at the site.

Table A - Examples of issues to consider relating to odour release

Factors leading to odour release	Examples of issues to consider
Those which have potential to affect the process and the generation of odour	• Materials input - seasonal variation in weather may affect odour of materials particularly if putrescible. • Process parameters such as changes in temperature/pressure • Rate of throughput or increased hours of operation • High levels of ammonia within the process buildings (possibly due to high ambient temperatures).
Those which affect the ability to abate/minimise odour	• Poor performance of biofiltration or poisoning (may be the result of poor maintenance or mis-operation) • Flooding of the biofilter due to abnormally high rainfall • External failure of other utilities, e.g. water supply, gas supply for combustion equipment where the operator has signed up to an interruptible gas supply
Those which affect the ability to contain odour	• Building damage which affects integrity due to for example storms • Power failure • Failure of automatic doors, i.e. in open position • Failure in procedures to maintain containment (human error)
Those affecting dispersion between the source and sensitive receptors‡	• Short term weather patterns which fall outside of the normal conditions for that area and are highly unusual (not just the normal meteorological pattern) - inversions and other conditions unfavourable to dispersion should have been considered in designing the process • Weather - wind direction, temperature, inversion conditions if these are normal variants of local weather • Loss of plume buoyancy/temperature
‡ The process design should incorporate control measures to ensure that under the normal range of meteorological conditions for the area, no emissions result in offensive odour that is detectable beyond the process boundary.	

Appendix 4 - Guidance on the application of BS EN 13725 (Dilution Olfactometry) to the assessment of odours from tobacco processing

British Standard BS EN 13725: 2003 "Air Quality - Determination of Odour Concentration by Dynamic Olfactometry" can be applied to the assessment of odours from tobacco processing. However, research* has established that certain practical steps need to be taken in connection with the collection of odour samples to minimise errors and maximise the repeatability of results.

These steps comprise:-

1. Analyse samples as soon as possible, preferably within 12 hours of sampling (when samples age for more than 12 hours, decay is likely to cause a reduction in odour concentration to half the original concentration at age 30 hours).

2. Use sampling bags made of Nalophan NA or benchmark the performance of other materials against Nalophan NA before using alternative materials.

3. Use pre-dilution when sampling only for the purpose of avoiding condensation during sample storage. Use an appropriate minimum dilution factor to avoid condensation.

4. Both nitrogen and high-purity (synthetic) air are suitable gases for use as neutral gas for pre-dilution.

5. When sampling tobacco odours, use an odourless filter to remove particles. This practice removes a source of variation and avoids contamination of equipment. The effect on results, despite being consistently lower in odour concentration, is not meaningful in terms of perceived intensity or annoyance potential, as the bias caused is small relative to the uncertainties of sensory analysis and the concentration differences that are relevant in terms of perceived difference of sensation.

* "Odour Concentration Decay and Stability in Gas Sampling Bags", A. Ph. (Ton) van Harreveld, published January 2003 in volume 53 of the Journal of the Air and Waste Management Association at page 51.