



Department  
for Environment  
Food & Rural Affairs

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## **Process Guidance Note 6/42(13)**

### **Statutory guidance for bitumen processes**

**December 2013**



Llywodraeth Cymru  
Welsh Government



**DOE**

Department of  
the Environment  
[www.doeni.gov.uk](http://www.doeni.gov.uk)



The Scottish  
Government

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# 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 the bitumen sector. It is published only in electronic form and can be found on the [Defra](#) website. It supersedes PG6/42(04). The **tar** sector should continue to use PG6/42(04).
- 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.

## Model permit

- 1.6 Many of the activities covered by this note will have essentially the same characteristics and it is expected that the model permit and application form 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.

- 1.7 In the case of activities covered by this note which oxidise bitumen, incinerate bitumen fumes, make refractory products, or for mobile plant if there are any, it is expected that regulators will continue to use standard applications and permits. (For roadstone coating, see paragraph 1.15)

For activities which oxidise bitumen, incinerate bitumen fumes, or make refractory products, in **Section 4 and Section 5**, arrows are used to indicate the matters which should be considered for inclusion as standard permit conditions. It is important to note, however, that this should not be taken as a short cut for regulators to a proper determination of BAT or to disregard the explanatory material which accompanies the arrows. In individual cases it may be justified to:

- include additional conditions;
- include different conditions;
- not include conditions relating to some of the matters indicated.

In addition, conditions will need to be derived from other parts of the note, in particular to specify emission limits, compliance deadlines and mandatory requirements arising from directions or other legislation.



## Who is the guidance for?

1.8 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
- 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

- 1.9 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.
- 1.10 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

- 1.11 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**

- 1.12 General guidance explaining LAPPC and setting out the policy and procedures is contained in separate documents for [England and Wales](#), [Scotland](#) and [Northern Ireland](#).

## **When to use another note rather than PG6/42**

- 1.13 PG6/44 is for manufacturing coating materials when the throughput is over 100 tonnes a year.
- 1.14 Coal tar processes using PG6/42, if there are any, should use PG6/42(04).
- 1.15 Roadstone coating processes should use PG3/15, and so should recycling road planings where it is an LAPPC activity.

## 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 <b>Appendix 1</b> and <b>Appendix 2</b> .		
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 <b>Table 6.1</b> . See <b>paragraph 2.4</b> .		

- 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. 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 the bitumen sector. 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	<a href="#">Section 6.3 Part B</a>	<a href="#">Section 6.3, Part B</a>	<a href="#">Section 6.3 Part C</a>
Part C	n/a	n/a	n/a
<p>The links are to the original version of the Regulations. A consolidated version is not available on <a href="http://www.legislation.gov.uk">www.legislation.gov.uk</a></p> <p>For England and Wales, an <a href="#">unofficial consolidated version</a> is available but read the first page of that document in order to understand its status and content.</p>			

- 3.2 This note does not apply to the use of bitumen in surface dressing or other construction applications, as these are not prescribed processes / listed activities.
- 3.3 This note refers processes involving the heating, but not the distillation of bitumen. These include:
- mastic asphalt production;
  - manufacture of roofing felt;
  - the blowing of bitumen;
  - impregnation of refractories with pitch;
  - production of waterproof paints which contain bitumen;
  - manufacture of carpet containing bitumen;
  - manufacture of packaging products containing bitumen; **and**
  - manufacture of acoustic panels for road vehicles and domestic appliances.

- 3.4 Processes which involve the distillation of bitumen or the production of electrodes using pitch are covered in Part A of the definitions in **Table 3.1** of this note. They are for central control and separate guidance is provided for these processes.
- 3.5 Bitumen blowing is sometimes carried out at oil refineries that are prescribed for Part A by the Regulations referred to in **Table 3.1** of this note. In these circumstances, the bitumen blowing will be regarded as part of the petroleum process.

## Coal tar

- 3.6 Coal tars are produced by the destructive distillation of coal. No UK processes using coal tar were identified at the time this note was revised, and this note no longer covers coal tar processes. Any Part B coal tar using processes should use the previous version of this note PG6/42(04).

## Bitumen

- 3.7 Bitumen is produced as a residue during the vacuum distillation of crude oil. It is composed of relatively high molecular weight alkanes, cycloalkanes and aromatics, along with heterocyclic oxygen, sulphur and nitrogen compounds and heavy metals. The PAH content of bitumens is less than that of coal tars because the vacuum distillation process removes much of the low boiling point material, including PAHs with 3-7 fused rings, and because the temperatures involved in production (350-450°C) are not high enough to initiate significant PAH formation. Consequently, most grades and derivatives of bitumen are regarded as being considerably less harmful than coal tars and the two substances should not be confused with each other.

## Oxidised bitumen or Blown bitumen

- 3.8 Manufacture of oxidised grades of bitumen involves blowing air through a bitumen feedstock. This is delivered molten from the oil refinery by road or rail and fed via storage tanks to the reactor. It is in the reactor that air is blown through the feedstock to produce a harder, oxidised product. The dehydrogenation and polymerisation reactions are exothermic and the temperature may need to be controlled by water sprays. Oxidised bitumen is drawn off the reactor and run down to dedicated storage. The oxidised bitumen is typically despatched to customers either hot in road vehicles, or cold in kegs. The keggings operation may involve pouring the bitumen at temperatures up to 230°C through either a jointed pipe or filler heads into siliconised paper bags, cardboard kegs or nylon sacks. The bitumen is then allowed to cool before being loaded for dispatch.

- 3.9 Blowing processes produce a noxious off-gas, composed of residual air, water vapour, CO<sub>2</sub> and H<sub>2</sub>S generated by the reaction of aliphatic and aromatic hydrocarbons from the bitumen. These off-gases are usually incinerated, possibly after separation of condensed oil and water vapour in a knockout drum or scrubber.

## Blended bitumen

- 3.10 A variety of bitumen blending operations are carried out. Mixing soft and hard bitumen e.g. 200 pen and 50 pen grades produces a range of intermediate penetration grade bitumens. Blending is also often undertaken with solvents such as kerosene and white spirit to produce cutback bitumens. The hotter the bitumen, the more solvent is emitted. Bitumen emulsions are manufactured by mixing molten bitumen with water containing emulsifiers. Cationic emulsions typically contain hydrochloric acid. Anionic emulsions are normally stabilised by sodium or potassium hydroxide.
- 3.11 Powdered or pelleted polymers may also be used to **modify** the properties of bitumen.
- 3.12 Blending bitumen, limestone and rockwool in a batch mixer produces sound-deadening sheet. The resultant mixture is then gravity fed to a smaller mixer from which it is passed to a unit that rolls and presses the material into a sheet. The sheet is pressed out into shapes.

## Asphalt

- 3.13 Mastic asphalt consists of graded limestone with a bitumen content of 12-17%, often including some Trinidad Lake asphalt (TLA). In some cases, a batch manufacturing process is used and graded limestone is mixed with a hot bitumen/TLA blend in agitated, heated mixing tanks. The mixer is normally heated by oil firing, with the mixing taking 2-5 hours at 230°C. Mastic is poured manually into moulds to cool and the finished blocks stacked before delivery. Some hot mastic may be off-loaded directly to a road tanker and taken hot to its place of use. Some mixing and block forming operations may also take place in automated plant where the mastic blocks are generally cooled by water sprays.

## Felt

- 3.14 Roofing felt is generally manufactured by passing a dry, rolled sheet of fabric such as waste rag, hessian, wood chip or polyester through a tank of penetration or oxidised grade bitumen at 150-200°C and then through heated rollers. A coating is then applied by passing the sheet through oxidised bitumen (or polymer-modified bitumen) and fillers. The coating is pre-blended in batch mixers. A final coating of sand and/or other mineral is applied by feeder, and the felt is then passed over water-cooled rollers, cut to length and packaged. A thin plastic film may be used to provide an alternative finish.
- 3.15 The manufacture of sheathing felt is a similar process, but carding flax or jute is used as a carrier.

## Coatings

- 3.16 The manufacture of bitumen-containing paints, coatings, waterproofing material and rustproofing materials often involves the mixing of bitumen with solvent, oils and fluxing agents in small batch mixers. The blended products are tapped off and packaged into drums, cans or tankers.
- 3.17 Where the coating manufacture or formulation uses 100 tonnes or more of solvent per annum, then PG6/44(11) should be applied.

## Refractories

- 3.18 The manufacture of impregnated refractory shapes typically involves the pre-heating of the refractory bricks before placing them in a heated vessel that is then evacuated and filled with petroleum pitch. Blanketing with nitrogen under pressure completes impregnation. When the cycle is complete surplus petroleum pitch is pumped back to storage. The refractory shapes are cooled before being fired in ovens for several hours. Finally, the shapes are shotblasted to remove surplus carbon from the refractory surface.

## Enamels

- 3.19 Bitumen enamel is a mixture of oxidised bitumen and a fine powdered inert filler. The blending of the inert filler with the oxidised bitumen in agitated heated mixing vessels produces the enamel. The finished product is filled off into drums, silicone-lined containers or road tanks at temperatures of up to 250°C.



- 3.20 The manufacture of outerwrap involves impregnating a continuous roll of glass fibre tissue or woven glass with bitumen enamel. The roll of tissue or woven glass fibre is passed over rollers and through a coating pan containing molten enamel. The material is then coated with an inert non-stick agent and passed over cooling rollers before being wound into rolls and cut to size.
- 3.21 Bitumen enamel, together with enamel-impregnated wraps, is used in the hot coat and wrap system to protect steel pipes. This process involves the flood coating of cleaned and primed pipe sections, usually by pouring hot liquid enamel onto a revolving pipe. At the same time, a glass tissue innerwrap is helically wound into the coating and an outerwrap fused onto the surface. The coated pipe is then passed through a quench cooling system and onto storage racks for inspection.

## 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.

- 4.4 The emission limits and monitoring provisions in **Table 4.1** should not be applied to vents serving tanks and silos used solely for storage of raw materials or finished products.

**Table 4.1 - Emission limits, monitoring and other provisions**

Row	Substance	Source	Emission limits/provisions	Type of monitoring	Monitoring frequency
1	Bitumen fume	Processes involving the heating of bitumen or petroleum pitch but not for storage tanks	50mg/m <sup>3</sup>	Extractive test	Annual
				Incinerators may comply with Table 4.1 row 6 instead	
2	Volatile organic compounds	Processes involving manufacture of, or in connection with, cutback bitumen or organic solvent based coatings	50mg/m <sup>3</sup>	Extractive test 30 minute average	Annual
				Incinerators may comply with Table 4.1 row 6 instead	
"Volatile organic compounds" includes organic solvents, and bitumen vapour after fume has been filtered out					
3	Total particulate matter	Exhausts from handling of dusty materials but not silo arrestment plant	50mg/m <sup>3</sup>	For exhausts over 50m <sup>3</sup> / minute - indicative monitor and record; see note 1 - extractive test, see note 1	Continuous Annual
4	Droplets, persistent visible emissions	All emissions to air	No droplets, No persistent visible emissions except condensed water vapour	Visual observations	*On start-up and on at least two more occasions during the working day*
5	Hydrogen sulphide	Processes for the manufacture of oxidised bitumen	Either 5mg/m <sup>3</sup> (30 minute average )	Extractive test	Twice a year
			Or apply Table 4.1 row 6		
6	Temperature	Incinerators	800°C and a residence time of 0.5 seconds	Monitor temperature and record Calibration of temperature	Continuously Annual
			For some incinerators at these conditions, smuts or odours may still be a problem, in which case an increase of temperature up to 1000°C may be needed.		
[7]	[Sulphur dioxide]	[All activities using heavy fuel oil or other residual type/comparable <a href="#">Quality Protocol Processed Fuel Oil</a> ]	[1% wt/wt sulphur in fuel]	[Sulphur content of fuel is regulated under the Sulphur Content of Liquid Fuels Regulations]	

[8]	[Sulphur dioxide]	[All activities using gas oil/ comparable <a href="#">Quality Protocol Processed Fuel Oil</a> ]	[0.1% wt/wt sulphur in fuel]	[Sulphur content of fuel is regulated under the Sulphur Content of Liquid Fuels Regulations]
<p>[Activities burning bio-fuels should have a limit set for sulphur in fuel Activities burning waste oil not covered by the <a href="#">Quality Protocol Processed Fuel Oil</a> must comply with Chapter IV of the industrial emissions Directive .]</p>				
<p><b>Note 1:</b> Bitumen fume may cause an overestimation of the amount of particulate matter present and may also result in the fouling of any monitoring instrument. The fitting of continuous monitors may not, therefore, be feasible in stacks where bitumen fume is present in significant quantities.</p>				

## Monitoring, investigating and reporting

- 4.5 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 or until the next inspection, whichever is the longer; **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

- 4.6 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.
- 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

4.7 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.

4.8 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

- 4.9 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.
- 4.10 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.
- 4.11 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.
- 4.12 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 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.

## 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 monitoring

- 4.14 Continuous monitoring can be either “quantitative” or “indicative”. With quantitative monitoring the discharge of the pollutant(s) of concern is measured and recorded numerically. For pollution control this measurement is normally expressed in milligrams per cubic metre of air, (mg/m<sup>3</sup>). Where discharge of the pollutant concerned is controlled by measuring an alternative parameter, (the “surrogate” measurement), this surrogate is also expressed numerically.

Continuous indicative monitoring is where a permanent device is fitted, for example, to detect leaks in a bag filter, but the output, whether expressed numerically or not, does not show the true value of the discharge. When connected to a continuous recorder it will show that emissions are gradually (or rapidly) increasing, and therefore maintenance is required. Alternatively it can trigger an alarm when there is a sudden increase in emissions, such as when arrestment plant has failed.



- 4.15 Where continuous indicative monitoring has been specified, the information provided should be used as a management tool. Where used, the monitor should be set up to provide a baseline output when the plant is known to be operating under the best possible conditions and emissions are complying with the requirements of the permit. Where used to trigger alarms, the instrument manufacturer should be able to set an output level which corresponds to around 75% of the emission limit. Thus the alarms are activated in response to this significant increase in pollutant loading above the baseline, so that warning of the changed state is given before an unacceptable emission occurs. The regulator may wish to agree the alarm trigger level.
- 4.16 Where continuous monitoring is required, it should be carried out as follows:
- All continuous 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 arrestment plant failure or malfunction.
  - All continuous monitors should be operated, maintained and calibrated (or referenced, in the case of indicative monitors) in accordance with the manufacturers' instructions, which should be made available for inspection by the regulator.
  - The relevant maintenance and calibration (or referencing, in the case of indicative monitors) should be recorded.

## **Calibration and compliance monitoring**

- 4.17 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.
- 4.18 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 extractive testing, no result of monitoring should exceed the emission limit concentrations specified.
- 4.19 For closed batch processes with no extraction, there may not be a flow which can be iso-kinetically sampled. In that case, the regulator should consider whether sampling produces useable measurements of concentration, or whether the closed nature of the process is sufficient control on the mass of emission.

4.20 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.

Dilution air may be added for waste gas cooling or improved dispersion where this is shown to be necessary because of the operational requirements of the plant, but this additional air should be discounted when determining the mass concentration of the pollutant in the waste gases.

4.21 Wet scrubbers should be fitted with continuous indicative monitors to demonstrate liquor circulation (e.g. variable orifice meters).

## Varying of monitoring frequency

4.22 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.

4.23 When determining “consistent compliance” the following are cases which might not qualify for a reduction in monitoring:

- a) variability of results: cases where monitoring results vary widely and include results in the range 30-45mg/m<sup>3</sup> (when the emission limit is 50mg/m<sup>3</sup>).
- b) the margin between the results and the emission limit: cases where results over a period are 45mg/m<sup>3</sup> or more (when the emission limit is 50mg/m<sup>3</sup>).

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.

Where a new or substantially changed process is being commissioned, or where emission levels are near to or approach the emission concentration limits, regulators should consider increasing the frequency of testing.

## **Monitoring of unabated releases**

- 4.24 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**

- 4.25 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).

## 5. Control techniques

### Summary of best available techniques

- 5.1 **Table 5.1** 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		
Substance	Source	Control techniques
Fume, PAH, Odour	Delivery to bitumen storage tanks	Pumped delivery, if needed when unloading tankers Siting Dispersion
Fume, PAH, Odour	Bitumen storage tanks	Temperature control
Odour, Fume, Particulate matter VOC, PAH	Melting, mixing, heating bitumen or tar	Contain Arrest if necessary
Odour, VOC, PAH	Blending hot materials and solvents	Contain emissions Control process temperature Arrest
Odours, fume, PAH, hydrogen sulphide	Oxidising bitumen	Incineration
Particulate matter	Silos, process vents and Handling dusty materials	Contain emissions Filter vents.
Sulphur oxides	Combustion gases	Limit sulphur in fuel oil

### Potential releases

- 5.2 The key emissions from these processes that constitute pollution for the purposes of the Pollution Prevention and Control Act 1999 and therefore warrant control are those consisting of bitumen fume, odour, poly-aromatic hydrocarbons (PAH), hydrogen sulphide, volatile organic compounds and particulate matter.

- 5.3 The following parts of the process may give rise to bitumen fume, PAH and odour:
- delivering, storing, heating, mixing and cooling bitumen.
- 5.4 The following parts of the process may give rise to volatile organic compounds and odour:
- delivering, storing solvents;
  - blending solvent with hot materials.
- 5.5 The following parts of the process may give rise to hydrogen sulphide, fume, PAH and odour:
- oxidising bitumen.
- 5.6 The following parts of the process may give rise to particulate:
- drying, handling, bagging, loading and unloading limestone and other solids;
  - transfer of potentially dusty materials including discharge into hoppers and onto conveyors, and delivery to storage silos.

## **Techniques to control emissions from contained sources**

### **Sulphur oxides**

- 5.7 Practically all the sulphur in a fuel is emitted as sulphur oxides ( $\text{SO}_x$ ). Limiting the sulphur in the fuel limits the emission of sulphur. The Acidification Strategy of the European Union has led to a Directive on sulphur content in certain liquid fuels. That Directive reduces the sulphur content of fuels meeting the definition of gas oil within the Directive to 0.1%. For residual oil the sulphur limit is 1%. The sulphur content of oil should be specified in the permit. The content should be confirmed by certificate from the supplier. Further on site testing of oil is not normally required.

### **Odour, bitumen fume, PAH**

- 5.8 Use of ground-based pumps can reduce emissions of bitumen fume from delivery of these materials. It is considered that such pumps will only constitute BAT in cases where there is an existing or reasonably anticipated odour impact arising from such deliveries.
- 5.9 Where lorry based compressors are used to pressurise the delivery, emissions of odour and fume can be reduced. One procedure, which can be used in some cases when clearing hoses and lines, is to use two short bursts of air rather than one long blow. The procedure to be used should be agreed with the regulator.

- 5.10 Where necessary to meet the odour provisions of paragraph 4.9 arising from the filling of road tankers with molten bitumen, emissions should be adequately contained by local exhaust ventilation and exhausted to suitable arrestment equipment or returned to the storage tank.
- 5.11 Odour from the handling and storage of hot materials may cause offence at or beyond the process boundary. Prevention may involve:
- the careful siting of storage tanks;
  - control of temperature; (See **Appendix 3** for storage and handling temperatures appropriate to bitumen grades. The rate of fume emission doubles for approximately every 11°C rise in temperature.) the use of modified bitumen may allow lower temperatures to be used in the process;
  - prevent overfilling of bulk tanks, ( if high level alarms or volume indicators cannot be used then overfill prevention procedures should be agreed); **and**
  - if necessary, containing and arresting exhaust gases.
- 5.12 Covered mixing tanks emit less fume etc. when bitumen is blended with organic solvents, polymers, limestone, or water.
- Mixing tanks in which bitumen is blended with other materials should be covered.

### **Volatile organic compounds**

- 5.13 VOCs from mixing and processing operations should be contained
- Emissions from mixing tanks and other processing equipment should be adequately contained by local exhaust ventilation.
- 5.14 Arrestment may be needed to meet the VOC limits specified in **Table 4.1**, row 2 and the odour provisions of paragraph 4.9, in which case:
- Emissions should be exhausted to suitable arrestment equipment.
  - The receipt, handling and storage of organic solvents and other volatile organic compounds should be carried out in such a way that emissions are prevented, or where not practicable due to process characteristics, minimised and rendered harmless. This should include control of emissions from nominally empty drums for example by the use of lids and careful location of empty drum storage areas, to meet the odour provisions of paragraph 4.9.
  - Emissions from bulk storage vessels during filling should either be vented to suitable arrestment plant or where practicable in relation to tanker offloading arrangements, backvented to the delivery tanker when needed to meet the odour provisions of paragraph 4.9.

- Bulk storage tanks should be fitted with a high-level alarm or volume indicator to warn of overfilling. Where practicable in relation to the viscosity of material being handled or the pumping system used, the filling system should be interlocked to the alarm to interrupt the filling operation at a predetermined level to prevent overfilling.

## Particulate matter

5.15 Emissions of particulate matter should be filtered if necessary to meet emission limits specified in **Table 4.1**.

- When limestone and other dusty materials are delivered in bulk, they should be stored in silos.
- Dusty materials such as limestone and polymers should be introduced into mixing tanks by means which minimise emissions of particulate matter, for example by using hoppers and screw feeding.

## Silos

- 5.16 The silo management system includes the high level alarms, arrestment plant and pressure relief valve. If best practice is being applied then any failure of the silo management system leads to full investigation of the operation of the plant and equipment. Continuous high level monitoring systems are currently available for use in storage silos. They may be used telemetrically to monitor stock within the silo. They may also be used to automatically stop delivery of material to the silo. It is expected that such systems will become more widely used in the future.
- 5.17 If deliveries are accepted from tankers without on board relief valve and filtration systems, particular care to avoid pressurisation of silos when venting air through the silo at the end of the delivery is needed.
- 5.18 Careful delivery by trained personnel will avoid materials being blown into silos at a rate which is likely to result in pressurisation of the silo, especially towards the end of the delivery when the quantity of material entering the ducting is reduced.
- 5.19 The following measures relating to arrestment plant on silos and other silo management techniques are only applicable where the silo vents to the external environment or where silo emissions may escape from inside a building into the external environment.
- All dusty or potentially dusty materials should be stored in silos, in confined storage areas within buildings, or in fully enclosed containers / packaging. Where the storage is open within a building, then suitable precautions should be taken to prevent wind whipping.

- When delivery to a silo or bulk storage tank takes place, displaced air should either be vented to suitable arrestment plant (for example cartridge/bag filters) or back vented to the delivery tanker, in order to minimise emissions. Arrestment plant fitted to silos should be of sufficient size (and kept clean) to avoid pressurisation during delivery.
- In order that fugitive emissions are minimised during the charging of silos, care should be taken to ensure that the transfer lines are securely connected to the silo delivery inlet point and the tanker discharge point, in that order. Tanker drivers should be informed of the correct procedures to be followed.
- Bulk storage tanks and silos containing dry materials should be equipped with audible and/ or visual high level alarms to warn of overfilling. The correct operation of such alarms should be checked in accordance with manufacturers' instructions.
- If emissions of particulate matter are visible from ducting, pipework, the pressure relief valve or dust arrestment plant during silo filling, the operation should cease; the cause of the problem should be rectified prior to further deliveries taking place. Tanker drivers should be informed of the correct procedure to be followed.
- Seating of pressure relief valves on silos should be checked. Immediately it appears that the valve has become unseated during silo filling, no further delivery should take place until corrective action has been taken. The pressure relief valve should be examined to check for defects before being re-set and a replacement valve fitted if necessary.
- If deliveries are accepted from tankers without on board relief valve and filtration systems, particular care should be taken to avoid pressurisation of silos when venting air through the silo at the end of the delivery.
- Care should be taken to avoid delivering materials to silos at a rate that is likely to result in pressurisation of the silo. If compressed air is being used to blow powder into a silo then particular care is required towards the end of the delivery when the quantity of material entering the ducting is reduced and hence the airflow is increased.
- All new silos should be fitted with an automatic system to cut off delivery in the event of over pressurisation or overfilling.



## Techniques to control fugitive emissions

- 5.20 Adequate provision to contain liquid and solid spillage is needed. Closed containers can prevent wind whipping of dusty, dry waste materials such as materials collected, or arising from particulate arrestment plant. Particular attention should be paid to preventing and cleaning up deposits of dust on external support structures and roofs in order to minimise wind entrainment of deposited dust

Dusty wastes should be stored and handled in a manner that avoids emissions. A high standard of housekeeping should be maintained.

## Air quality

### Dispersion & dilution

- 5.21 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.

- 5.22 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.
- 5.23 Where offensive odour is likely outside the process site boundary the assessment of stack or vent height should take into account the need to effectively disperse offensive odour.

## Ambient air quality management

- 5.24 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

- 5.25 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.
- 5.26 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.

# Management

## Management techniques

5.27 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

5.28 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.

5.29 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

- 5.30 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

- 5.31 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
	Coal tar processes have been dropped from the note	No current coal tar processes have been identified	If there are any, they can use the 2004 guidance note
Paragraph 4.11	Daily odour observations during problems, rather than everyday	To reduce monitoring costs	
Paragraph 4.19	Closed batch processes might consider mass of emissions rather than emission concentrations	Non iso-kinetic sampling on closed batch processes may not give reliable results	'Closed process' may be sufficient control without the need for an emission limit value or regular measurement
Appendices 1 and 2	A model permit and application form have been added	To speed up application, permit writing and inspection	

## 7. Further information

### Sustainable consumption and production (SCP)

Both business and the environment can benefit from adopting sustainable consumption, production, design and raw material selection 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 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 bitumen installations mixing hot bitumen with solids or solvents and then making or delivering products. The model permit is not for installations who oxidise bitumen, incinerate fumes, or make refractory products, or for coal tar processes— see paragraph 1.6 from introduction of this note and paragraph 3.6 of the [General Guidance Manual on Policy and Procedures](#). [The model permit is not for installations regulated in Northern Ireland by NIEA.](#)

## **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 until the next inspection or for 24 months whichever is the longer.



[       ] 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 activity<sup>1</sup> at the installation (B) subject to the following conditions.

## **Emissions**

1. *If appropriate to resolve odour problems from delivery* [Bitumen shall be pumped, not blown, from road tanker to site storage]

## **Temperature control**

2. Bitumen silo storage temperature shall be controlled, [and high level alarms / overfilling indicators / procedure for preventing overfilling] shall be operated.

(*This link is not part of the permit conditions but the Energy Institute publishes [Recommended bitumen handling and storage temperatures](#).*)

## **Processing**

3. Process tanks and vessels shall be: fully enclosed and fitted with [level indicators/high level alarms]; [*list*]
4. Process machines that handle molten bitumen mixtures and are not fully enclosed shall have local exhaust ventilation fitted [*list*]

## **Silos and bulk tanks where pneumatic transport is used**

5. Materials delivered by pneumatic transport shall be stored within silos. Silos and bulk containers of dusty materials shall not be overfilled and there shall be an overfilling alarm. When loading silos, ensure delivery is at a rate which does not pressurise the silo. [*For silos which are new or replacement plant since September 2004*, Deliveries must stop automatically where over-pressurisation or over-filling is identified]. Displaced air from pneumatic transfer shall pass through abatement plant.

## **Other 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) 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.
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. 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.

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<sup>1</sup> listed in [ ] in Part 2 of Schedule 1 to the Environmental Permitting Regulations

## **Records and training**

10. Written or computer records of all tests and monitoring shall be kept by the operator until the next inspection, or for at least [24] months whichever is the longer. They shall be made available for examination by the regulator. \*Records shall be kept of operator inspections, including those for odorous emissions.\*
11. 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\*.

*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**

12. 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.

## **Process changes**

13. 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	Bitumen fume	Processes involving the heating of bitumen or petroleum pitch but not for storage tanks	50mg/m <sup>3</sup>	Extractive test	Annual
2	Volatile organic compounds	Processes involving manufacture of, or in connection with, cutback bitumen or organic solvent based coatings	50mg/m <sup>3</sup>	Extractive test 30 minute average	Annual
"Volatile organic compounds" includes organic solvents and bitumen vapour after fume has been filtered out					
3	Total particulate matter	Exhausts from handling of dusty materials but not silo arrestment plant	50mg/m <sup>3</sup>	For exhausts over 50m <sup>3</sup> / minute <ul style="list-style-type: none"> <li>if feasible[ indicative monitor and record,]</li> <li>extractive test (<b>see note e</b>)</li> </ul>	[Continuous]  Annual
4	Particulate matter	Silos	10mg/ m <sup>3</sup>	Design limit	
5	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*
6	Visible smoke	Combustion processes should be free from visible smoke: see note d	No visible smoke	Visual observations	*On start-up and on at least two more occasions during the working day*
7	Sulphur dioxide	All activities using heavy fuel oil or other residual type/comparable <a href="#">Quality Protocol Processed Fuel Oil</a>	1% wt/wt sulphur in fuel	Sulphur content of fuel is regulated under the Sulphur Content of Liquid Fuels Regulations	
8	Sulphur dioxide	All activities using gas oil/ comparable <a href="#">Quality Protocol Processed Fuel Oil</a>	0.1% wt/wt sulphur in fuel	Sulphur content of fuel is regulated under the Sulphur Content of Liquid Fuels Regulations	

*Delete this row if rows 7 & 8 are deleted* Activities burning bio-fuels should have a limit set for sulphur in fuel  
Activities burning waste oil not covered by the [quality protocol processed fuel oil](#) must comply with chapter IV of the industrial emissions Directive.

**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 smoke emission limits do not apply during start-up. All emissions shall be kept to a minimum during these periods.
- e) Bitumen fume may cause an overestimation of the amount of particulate matter present and may also result in the fouling of any monitoring instrument.

*These 'right to appeal' notes are not part of the permit*

## **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

## Application for a permit for a bitumen activity

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 bitumen heating 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    Does the installation:**

make refractory products?                      ☐ Yes      ☐ No

oxidise bitumen?                                  ☐ Yes      ☐ No

incinerate bitumen fumes?                      ☐ Yes      ☐ No

heat coal tar?                                      ☐ Yes      ☐ No

Is the installation a mobile plant?              ☐ Yes      ☐ No

Does the installation coat roadstone?   ☐ Yes      ☐ No    **If yes, use PG3/15, not this note**

**If you have answered 'yes' to any of B1, the installation is not suitable for a simple permit under PG6/42.**

### **B2    Do you heat more than 5 tonnes of bitumen a year to make things?**

☐ Yes    ☐ No

### **B3    Why is the application being made?**

☐ new installation

☐ change to existing installation means it now needs a permit

### **B4    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: \_\_\_\_\_

**B5 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

☐ Yes ☐ No

1km - where the installation involves mineral or cement and lime activities

☐ 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: \_\_\_\_\_

**B6 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 Which of these products do you make using bitumen:

- a) mastic asphalt production ☐ (tick all that apply)
- b) manufacture of roofing felt ☐
- c) manufacture of carpet containing bitumen ☐
- d) manufacture of packaging products containing bitumen ☐
- e) manufacture of acoustic panels for road vehicles and domestic appliances ☐
- f) production of waterproof paints which contain bitumen ☐
- do you add organic solvent as you make the paint? ☐ Yes ☐ No
- g) other - please describe briefly \_\_\_\_\_

### C2 About your bitumen storage silos:

*[informs condition 2]*

- Are they fitted with high level alarms? ☐ Yes ☐ No
- Are they fitted with volume indicators? ☐ Yes ☐ No
- If neither, do you have procedures to prevent overfilling? ☐ Yes ☐ No
- Do the silos control the bitumen storage temperature? ☐ Yes ☐ No
- Is bitumen pumped or blown from the delivery tanker into the silos?
- ☐ Pumped ☐ Blown

### C3 Please list any of your process tanks/vessels/machines that handle molten materials and are not are fully enclosed?

*[informs Table 1, condition 3]*

- a) \_\_\_\_\_ b) \_\_\_\_\_ c) \_\_\_\_\_ d) \_\_\_\_\_
- e) \_\_\_\_\_ f) \_\_\_\_\_ g) \_\_\_\_\_ h) \_\_\_\_\_

Are they all fitted with local exhaust ventilation?

*[informs Table 1, condition 4]*

☐ Yes ☐ No

### C4 Do you extract odorous or organic solvent laden air through abatement plant?

*[informs Table 1]*

☐ Yes ☐ No

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

- a) wet scrubber ☐ (tick all that apply)
- b) bag filtration plant ☐
- c) cyclones ☐
- d) other - please specify \_\_\_\_\_

**C5 Do you have continuous emissions monitors for monitoring particulate?**

*[informs Table 1, condition 8]*

☐ Yes ☐ No

**If yes, do the continuous emissions monitors have alarms?**

☐ Yes ☐ No

**If yes, are the alarms:**

- a) visible? ☐ (tick all that apply)  
b) audible? ☐

**C6 Does your process receive dusty materials?**

*[informs Table 1, condition 6]*

☐ Yes ☐ No

**If yes, please indicate the storage facilities used on site to store dusty materials:**

*[informs condition 6]*

- a) silo ☐ (tick all that apply)  
b) bulk storage tank ☐  
c) in fully enclosed containers/ packaging? ☐  
d) other - please specify \_\_\_\_\_

**C7 Do you have pneumatic loading/unloading for dusty materials?**

*[informs Table 1, condition 5]*

☐ Yes ☐ No

**If yes, will displaced air from pneumatic loading and unloading be:**

- a) vented to abatement plant ☐ (tick all that apply)  
b) back-vented to the delivery tanker ☐  
c) other - please specify \_\_\_\_\_

**Does, pneumatic transfer automatically stop for:**

- a) over-filling ☐ (tick all that apply)  
b) over-pressurisation ☐

**If no, are any silos new since 1<sup>st</sup> October 2004?**

☐ Yes ☐ No

**Do you have alarms to warn of overfilling?**

☐ Yes ☐ No

**C8 Will your process produce any dusty waste?**

*[informs condition6]*

☐ Yes ☐ No

**If no, go to C9**

**If yes, how will dusty material/dusty waste be contained?**

- a) bagged ☐ (tick all that apply)
- b) lidded containment ☐
- c) other – please specify: \_\_\_\_\_

**C9 Do you have environmental management procedures and policy?**

*[informs conditions 10 , 11]*

☐ Yes ☐ No

**C10 Have you received any complaints of odour beyond the site boundary in the last three years, including those notified to site by the local regulator?**

*[informs condition1]*

☐ Yes ☐ No

**If yes, please complete the following:**

- a) How many complaints have you received in the last three years?

\_\_\_\_\_

- b) What is the date of the last complaint received at site?

\_\_\_\_\_

## **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 - Recommended bitumen handling and storage temperatures

[Recommended bitumen handling and storage temperatures](#) are published by the Energy Institute and maintained by their Energy Institute Bitumen Panels. The maximum handling and storage temperatures are important for odour prevention.

Mixing, application and short term storage temperatures of bitumen will be determined by the particular application. For polymer modified bitumens, emulsions and proprietary products advice on handling and storage should be obtained from the supplier.

The Energy Institute Bitumen safety code contains health and safety as well as environmental protection good practice, however the permit must not contain conditions whose only purpose is to secure the health of people at work.

## Appendix 4 - Monitoring of bitumen fume

- A4.1. The reference test method for bitumen fume emissions in chimneys or ducts should normally be that described in British Standard 13284-1: and tests should generally be carried out according to the main procedural requirements of that standard.
- A4.2. The procedures specified in BS 13284-1 are not appropriate in every respect for monitoring the sticky aerosol which is typically emitted from bitumen processes and which is difficult to measure.
- A4.3. The emissions of bitumen fumes are a balance of vapour and particles, which is temperature dependent. As the temperature of the emissions falls, the balance between vapour and solid changes as more vapour condenses, particles form, grow larger and stick together.
- A4.4. Some products have volatile organic solvents added which add to the vapour component of emissions.
- A4.5. Some modification of the sample collection methodology is therefore likely to be necessary. A study undertaken by TBV Science suggested that necessary modifications were:
- The filter or separating device should be close to the sampling nozzle to avoid the loss of sticky material in the section of the probe before the filter. Consideration should be given to the desirability of using an integrated filter and sampling nozzle. Such an arrangement will account for any losses before the filter, although the high tare weight of the unit may give rise to errors.
  - For integrated units an alternative is to weigh the filter medium in the integrated unit and also clean out and measure the material deposited in the nozzle upstream of the filter
  - The filter should be able to capture aerosol at 0.3µm with 98% efficiency.
  - When bitumen fume is to be measured in the presence of mineral particulate matter, the bitumen fume collected on the filter should be determined as cyclohexane-soluble material according to NIOSH method 5023 or HSE method MDHS 68. This will avoid over-estimation of emissions of bitumen fume.
  - Drying of filters for total particulate determination, and evaporation of solvent for cyclohexane-soluble material should be carried out at a temperature not exceeding 42°C to minimise loss of condensed volatile compounds.

- A4.6. Ideally, sampling times should be sufficient to meet the weighing uncertainty criterion set in BS 13284-1. However, where particulate concentrations are low, this may not be feasible. For low concentrations, the appropriate sampling time may be calculated by assuming the emission concentration is the same as the emission concentration limit. Where processes are operated on a batch basis, it may be appropriate to sample for the duration of a process cycle.
- A4.7. The following table offers techniques or equipment that should allow reasonable measurements to be taken.

<b>Table A - Suitable bitumen sampling methods</b>		
<b>Exhaust gas temperature</b>	<b>Bitumen fumes</b>	<b>Solvent measurement for cutback bitumen and organic solvent based coatings</b>
<42°C	Gravimat Zambelli	Adsorption after filtration e.g. Volatile Organic Solvent Train (VOST )
>42°C	US EPA method 5A (which includes filtration at 42°C)	Adsorption after filtration at 42°C, e.g. Volatile Organic Solvent Train. VOST

- A4.8. The Gravimat and Zambelli equipment both have in-stack sampling heads close to the sampling nozzle and the filter is at stack temperature.
- A4.9. For stack temperatures over 42°C, the filtered material may evaporate and an alternative method is needed. In US EPA method 5A, the filter is outside the stack and is cooled to 42°C ±10°C. However, material inside the probe liner has to be washed out and measured and this can lead to increased errors, if adequate care is not taken.
- A4.10. When solvents have been added, e.g. in the making of cutback bitumen and various bitumen products, measurable solvents can be expected in the emissions. Adsorption after the fume has been filtered at 42°C or lower is the suggested technique. A Volatile Organic Sampling Train (adapted from US EPA method 23) should be appropriate after the bitumen fume has been filtered either at 42°C, or stack temperature if it is lower.
- A4.11. If the combined total emission of particulate matter, and bitumen fume are below either of their emission limits, only the one test is needed to demonstrate compliance.