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Process Guidance Note 3/02(12)

Statutory guidance for manufacture of heavy clay goods and refractory goods

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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 Assembly 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 Manufacture of heavy clay goods and refractory goods. It is published only in electronic form and can be found on the Defra, website. It supersedes PG3/02(04) and NIPG3/2 (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[1] giving guidance on the Best Available Techniques (BAT)[2]. 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.

1.4 In general terms, what is BAT for one installation in a sector is 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 is 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] this and other notes in the series are issued as statutory guidance in England and Wales under regulation 64(2) of the Environmental Permitting Regulations. The notes are also issued as guidance in Scotland and statutory guidance in Northern Ireland

[2] further guidance on the meaning of BAT can be found for England and Wales, Scotland, and Northern Ireland.

Simplified or standard permits

1.6 Most of 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 businesses 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.

In the case of activities making refractory goods including furnace liners, it is expected that regulators will continue to use standard applications and permits.

Sites with more than one Pt B activity (Part C in Northern Ireland) which in accordance with the relevant charging scheme are to be treated as a single activity will require a full permit not a simplified permit, therefore the whole installation comprising both activities should be subject to a full permit.

1.7 For activities making refractory goods, including furnace liners, in **Section 4** and **Section 5**, arrows are used to indicate the matters which should be considered for inclusion as 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 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

1.9 The guidance is based on the state of knowledge and understanding, at the time of writing, of what constitutes 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.

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 amended or removed. 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
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**.		

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 2** 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 appropriate Regulations[3]. Further guidance on permit reviews is contained in the appropriate Guidance Manual for England and Wales, Scotland and Northern Ireland. 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] For details see England and Wales, General Guidance Manual chapter 26, Scotland, Practical guide section 10, Northern Ireland Part B Guidance page 9, Northern Ireland Part C Guidance chapter 17.

3. Activity description

Regulations

3.1 This note applies to LAPPC installations for the manufacture of heavy clay goods and refractory goods. The activities for regulation are listed in Table 3.1.

Table 3.1 - Regulations listing activities

LAPPC	Activity	England and Wales	Scotland	Northern Ireland
Part B		Section 3.6 Part B	Section 3.6 Part B	n/a
Part C		n/a	n/a	Section 3.6 Part C
The links are to the original version of the regulations. A consolidated version is not available on www.legislation.gov.uk				

3.2 This note refers to processes for the manufacture of heavy clay goods and refractory products in which:

a. raw materials are stored, handled and mixed, and which may include such materials as calcium carbonate, sand or organic compounds;

b. heavy clay or other raw materials may be moulded, pressed, extruded or dried;

c. the material is fired in a kiln, for example a tunnel, annular, periodic or rotating kiln.

3.3 Heavy clay goods will normally include, for example, bricks, roof tiles, pavers and pipes, but not fine china, pottery or bone china.

3.4 Refractory goods should normally be taken to include, for example, furnace liners but not electrical heat-resisting ceramics or gas fire radiants.

3.5 This note also refers to processes involving the vapour glazing of ceramics with salt.

3.6 Process Guidance Note for Mineral Drying Processes, PG3/18, may be referred to where appropriate.

Outline of Process Descriptions

Brick manufacture

3.7 Clay winning may be performed on an annual basis to provide clay for the year's production or on an intermittent or a continuous basis. It is stored in compacted stockpiles. Dust emissions to the air are negligible when winning due to the natural water content of clay. A water spray may be necessary to keep the surface of the stockpiles damp in dry weather.

3.8 Clay is dug from the stockpile and tipped into a receiving hopper. Transfer to the factory may be by conveyor, in which case exposed sections should be covered or enclosed. An optional clay store may provide a strategic reserve of material under cover. Clay may be fed from the clay store, using (for example) a front end loading shovel, to a box feeder for conveyance into the clay preparation area.

3.9 Clay is discharged into the clay preparation area. It is first of all fed into a primary grinding process (which may involve the addition of water). It may then be conveyed for further processing through medium and high speed rolls.

3.10 Dust from the grinding plant is extracted to bag filters and cleaned air is exhausted to the atmosphere or returned back into the factory (provided COSHH requirements are met.)

3.11 The clay from the preparation plant is conveyed via a surge control feeder to mixers where it is adjusted to the required moisture content by the addition of water if necessary. Materials are also added at this stage such as colourants or materials to increase the tolerance of the material to the subsequent firing. It then passes to the shaping operation.

3.12 If the shaping is by extrusion, the material is passed through an extruder where it is formed into a column. To aid passage through the extruder the clay is lightly oiled with linseed oil or similar. The extruded clay column is cut by wires into individual wet units. These may then receive a variety of surface textures and surface blasted sanded colours. Where sand blasting takes place this is carried out within an enclosed cabinet and dust-laden air is extracted to bag filter units.

3.13 If shaping is by moulding, the material mix contains a higher degree of moisture. It is first of all divided into "clots" which are slightly larger than the resulting unit and these clots are either thrown or dropped vertically into a series of moulds which may contain sand and colourants. Optionally, the mould may be subjected to a very light pressure which removes the texture produced by entering the mould. The mould is then trimmed to remove surplus clay mix and the unit is then demoulded.

3.14 If the shaping is by pressing, the material mix is placed into the pressing chamber, which may contain sand and colourants, and subjected to a pressure adequate to form a coherent body and is then demoulded.

3.15 The clay ware is loaded onto dryer cars and placed into drying chambers or a tunnel dryer. Dryers are heated using clean, hot air recovered from the cooling zone of the kiln where tunnel kilns are in use, and natural gas fired heaters make the temperature up to approximately 120°C. Drying usually takes place over approximately a 24 hour period, but can be longer where materials are sensitive to the rate of drying. The emissions from the dryers consist of water vapour which is exhausted to atmosphere via stacks situated at least 3m above the roof ridge height.

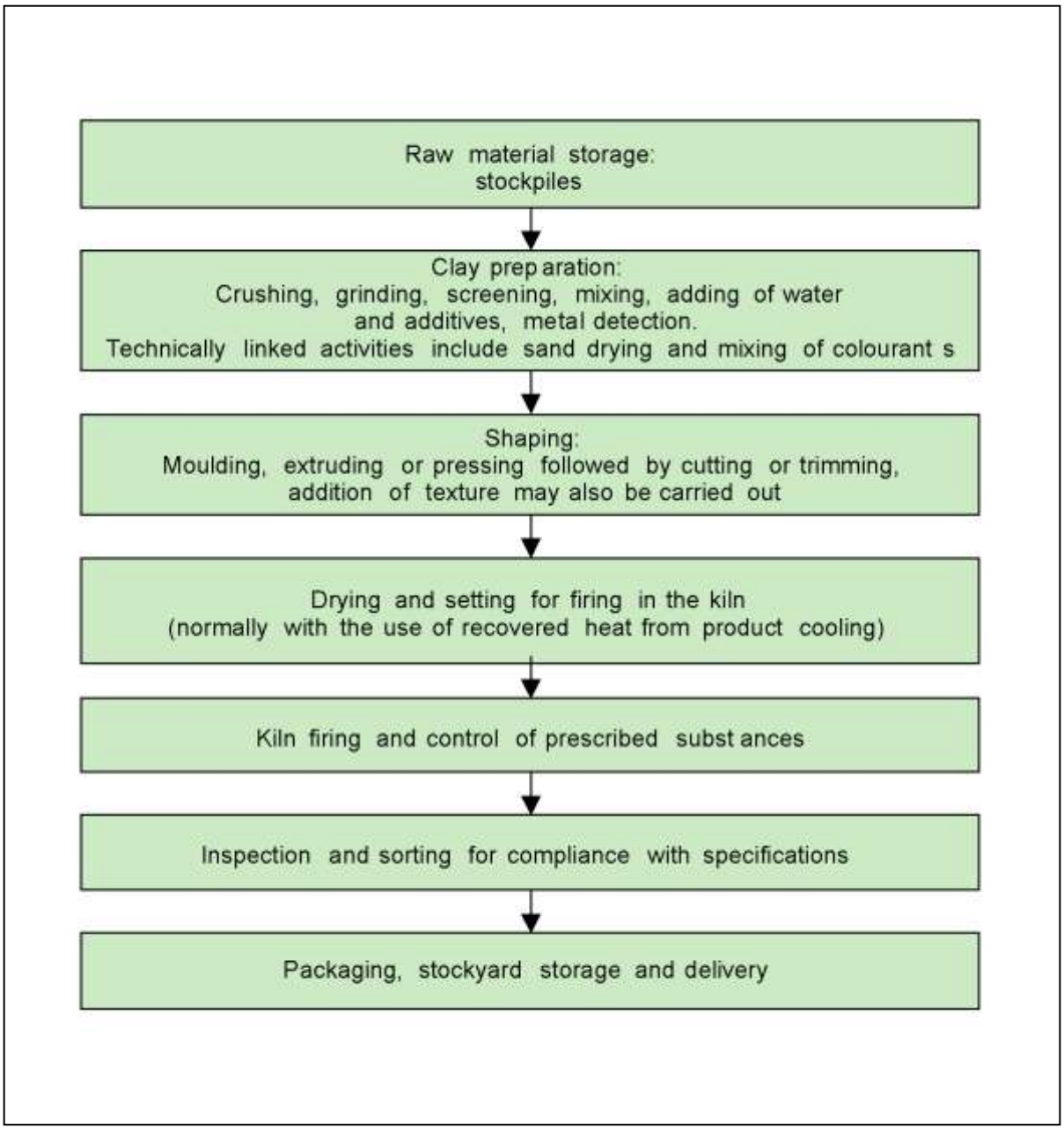
3.16 Once dried, the units are progressed to a setting station (which may be a machine) where they are loaded ready for firing. In modern automated plant this involves the use of kiln cars which are then positioned in the kiln for firing. The kiln may be a tunnel type, which gives rise to a continuous firing process as cars join a "train of cars" and move through the kiln. Otherwise the kiln may be of a continuous chamber type where the units remain stationary and the fire moves around the kiln. In either case some degree of equilibrium is reached in the firing process and therefore the flow of exhaust gases is relatively stable in terms of temperature, composition and volume.

3.17 It is possible for firing to be of an intermittent type which is conducted in batch or shuttle kilns. Firing takes place from ambient temperature up to top firing temperature and back to ambient temperature over a period which may be as long as 3 days or more. The operational cycle of an intermittent kiln comprises both the heating and cooling processes. This type of firing is in sharp contrast with the steady state conditions of the continuous kiln. In this case the profile of the kiln exhaust flow will be markedly different during the various stages of the firing and cooling cycle. Different criteria are therefore appropriate when considering regimes for monitoring and measurement of these processes.

3.18 Kiln gases may be treated to reduce the hydrogen fluoride content before being emitted to atmosphere via a high stack, commonly about 25 metres, if the kiln is above the thermal input threshold of 2 MW.

3.19 After firing the units are cooled and the kiln is unloaded. They are inspected for quality and packed, ready for despatch.

Figure 3.1: Flow diagram of a typical brick manufacturing process



High temperature refractory products

3.20 The principal raw materials are magnesia (magnesium oxide) and doloma (calcined and sintered dolomite). These purchased materials are stored in bulk before being crushed and screened as two distinctively separate product streams. Different grades of each are used to manufacture different products.

3.21 The components of a specific formulation, including small quantities of additives and a binder, are discharged into a mixer. Refractory mixing is a batch operation. Where the binder used is pitch, the operation falls under the bitumen and tar prescribed process definitions and **PG 6/42 Bitumen and Tar Processes** is the relevant process guidance note.

3.22 Completed mixes are transferred to the feed hoppers of large hydraulic presses, with operating pressures up to 3200 ton/in^2. A variety of metal mould designs permit the production of a wide range of refractory brick shapes and sizes.

3.23 The pressed (green) refractory bricks then undergo heat treatment. Resin and carbon bonded products are subject to low temperature (250 - 300°C) tempering in a continuous, indirect fired kiln process. Fired basic, dolomite and sliding gate components undergo high temperature firing, within a 1455 - 1640°C firing range. Both continuous tunnel kilns and intermittent kilns are used. All heating processes are natural gas fired.

3.24 After heat treatment, products may be involved in elements of further processing before final packing and storage ready for despatch. Further processing may involve sizing, colour coding, labelling, plating, carding, cutting, drilling and grinding.

3.25 The products are used primarily for steel and cement making processes.

4. Emission limits, monitoring and other provisions

4.1 Emissions of the substances listed **Table 4.1** below 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, except for kiln emissions, where the reference conditions should be normalised to 18% oxygen measured dry, averaged over the firing cycle of the kiln.

Table 4.1 - Emission limits, monitoring and other provisions					
Row	**Substance**	**Source**	**Emission limits / provisions**	**Type of monitoring**	**Monitoring frequency**
1	Particulate matter	Kilns with a net rated thermal input of 2MW or more.	100 mg/m^3	Isokinetic monitoring	Annual
2	Particulate matter	Kilns with a net rated thermal input of less than 2MW.	Should not exceed the equivalent of Ringelmann shade 1	Operator observations	At least daily when the kiln is in operation
3	Particulate matter	All emissions to air Silos new since July 1st 2004	No visible emission Designed to emit less than 10mg/ m^3	Operator observations	At least daily
4	Particulate matter	Arrestment equipment* with exhaust flow >300 m^3/min (other than from kilns and silo arrestment plant).	50 mg/m^3	Indicative monitoring	Continuously recorded
				Isokinetic sampling	At least once to demonstrate compliance, then as necessary to provide a reference for the continuous indicative monitor
5	Particulate matter	Arrestment equipment* with exhaust flow >100 m^3/min (other than from kilns and silo arrestment plant).	Designed to achieve 50 mg/m^3	Indicative monitoring to demonstrate that the arrestment equipment is functioning correctly.	Continuous
6	Particulate matter	Arrestment equipment* with exhaust flow <100 m^3/min (other than silo arrestment plant).	No visible emission.	Operator observations	At least daily
				OR	
				Indicative monitoring to show that the equipment is functioning correctly	Continuous

7	Oxides of Nitrogen (measured as nitrogen dioxide)	All new or substantially changed processes (with a net rated thermal input of 2MW or more).	500 mg/m^3.	Annual manual extractive test.	Annual.
8	Chloride (expressed as hydrogen chloride)	All new or substantially changed processes (with a net rated thermal input of 2MW or more).	50 mg/m^3	Manual extractive test	Annual
9	Fluoride (expressed as hydrogen fluoride)	All kilns (with a net rated thermal input of 2MW or more).	10 mg/m^3	Manual extractive test.	Annual
10	Sulphur dioxide	New or substantially changed plant (with a net rated thermal input of 2MW or more) where low sulphur clays are used (</= 0.12% w/w sulphur)	500 mg/m^3	Extractive test	Annual
11	Sulphur dioxide	New or substantially changed plant (with a net rated thermal input of 2MW or more) where high sulphur clays are used (>0.12% w/w sulphur)	2000 mg/m^3	Extractive test.	Annual
12	Sulphur dioxide	All activities using heavy fuel oil or other residual type/comparable Quality Protocol Processed Fuel Oil	1% wt/wt sulphur in fuel	Sulphur content of fuel is regulated under the Sulphur Content of Liquid Fuels Regulations	
		All activities using gas oil/ comparable Quality Protocol Processed Fuel Oil	0.1% wt/wt sulphur in fuel		
* Where the plant is discharging to the external atmosphere.					
Activities burning waste oil not covered by the quality protocol processed fuel oil must comply with the Waste Incineration Directive (WID).					

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.

- 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 should in normal operation 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 for local meteorological conditions which 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.

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 inspect in order to find out which part of their operation(s) is the cause.

Whilst problems are ongoing, a boundary check should also be made 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.

Abnormal Events

4.9 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.

Start up and shutdown

4.10 Higher emissions may occur during start-up and shut-down of a process. These emissions can be reduced, by minimising, where possible, the number of start-ups and shutdowns and having adequate procedures in place for start-up, shutdown and emergency shutdowns.

All appropriate precautions must be taken to minimise emissions during start-up and shutdown.

Continuous Monitoring

4.11 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^3). 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.

4.12 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.

4.13 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;
- The activation of alarms should be automatically recorded;

- 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;

- 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 (CEM) 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.

Calibration and compliance monitoring

4.14 Compliance monitoring can be carried out either by use of a continuous emissions monitor (CEM), or by a specific extractive test carried out at a frequency agreed with the regulator.

4.15 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 extractive test and comparing the results with those provided by the CEM.

4.16 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;

4.17 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. 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.

Varying of monitoring frequency

4.18 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.

4.19 The following should be considered when deciding whether compliance is consistent:

a. the variability of monitoring results, for example, results which range from 30 - 45 mg/m3, against an emission limit of 50 mg/m3 might not qualify for a reduction in monitoring.

b. the margin between the results and the emission limit, for example, results which range from 45 - 50 mg/m3 when the limit is 50 mg/m3 might not qualify for a reduction in monitoring.

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.

4.20 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

4.21 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.

Representative Sampling

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

4.23 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.

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

Sources of dust	Control techniques
Loading and unloading processes **Conveyor transfer points**	**Within buildings** **Suppression** **Reduced drop heights** ▪ use of variable height conveyors ▪ use of chutes **Dust arrestment (loading area)** ▪ bag filters/cartridge filters
Double handling transfer points	**Site and process design**
Delivery from road tanker to silo It is common for overcharging of silos to cause the pressure relief valve to lift, thereby causing an unacceptable emission.	**Process control, for example**: High level monitor with alarms Tanker controls Automatic protection system
Silos	**Dust arrestment** ▪ bag filters ▪ cartridge filters
Raw material storage	**Storage silos** ▪ Bags ▪ Within buildings
Conveyors, conveyor transfer points	**Containment** ▪ wind boards **Appropriate siting** ▪ away from site boundary especially if near residential or other sensitive receptors

Drying, grinding and milling processes	**Within process buildings** **Dust arrestment** ▪ bag filters / cartridge filters **Wet arrestment** ▪ venturi scrubbers
Blending, packing processes etc.	**Containment** **Reduced drop heights** **Dust arrestment** ▪ bag filters / cartridge filters
Roadways including haulage roads	**Suppression** ▪ site and process design
External operations **Conveyors** **Roadways**	**Appropriate siting** ▪ away from site boundary especially if near residential or other sensitive receptors **Wind dynamics management** ▪ use of fencing, bunding, profiling etc.
Vehicles - bodies and wheels	**Wheel-wash and under-body vehicle wash**
Lorries, trains	**Covering** ▪ dust covers
Sources of fluoride emissions	**Control technique**
Fluoride in clay emitted during firing	**Process optimisation** **Dry alkaline scrubbing** **Dispersion in the atmosphere**

Techniques to control emissions from contained sources

5.2 Best available techniques are required to control dust emissions, for example from reception, storage and handling of potentially dusty materials, internal transportation (whether by pneumatic means, in vehicles, front loaders or on conveyors), processing, loading and unloading. Potential fugitive emissions, which are those from non-contained sources such as roads and other surfaces also, need to be controlled.

5.3 The main principles for preventing dust emissions are containment of dusty processes and suppression of dust using water or proprietary suppressants. Suppression techniques need to be properly designed, used and maintained, in order to be effective. For example, where water is used for dust suppression, processes require an adequate supply of water and all water suppression systems need adequate frost protection. To demonstrate an adequate water supply on tanks that are not fed from the mains, a low level alarm could be fitted.

5.4 Protection of external sources, such as stockpiles and external conveyors, from wind whipping is necessary. There are various methods that may be used to this end.

5.5 The control techniques described below address the sources of pollutants listed in **Table 5.1.**

Silos

5.6 The silo management system includes the high level alarms, arrestment plant and pressure relief device. 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.

5.7 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. 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.

5.8 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 backvented 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, transfer lines should be 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, or volume indicators, to warn of overfilling. The correct operation of such alarms should be checked in accordance with manufacturers' instructions. If manufacturers instructions do not specify, then the check should be weekly or before a delivery takes place, whichever is the longer interval;

- If emissions of particulate matter are visible from ducting, pipework, the pressure relief device 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 devices on silos should be checked at least once a week, or before a delivery takes place, whichever is the longer interval;

- Immediately it appears that the device has become unseated during silo filling, no further delivery should take place until corrective action has been taken. The pressure relief device should be examined to check for defects before being re-set and a replacement fitted if necessary. Tanker drivers should be informed of the correct procedure to follow;

- Deliveries to silos from road vehicles should only be made using tankers with an on-board (truck mounted) relief valve and filtration system. This means that venting air from the tanker at the end of a delivery will not take place through the silo. Use of alternative techniques may be acceptable provided that they achieve an equivalent level of control with regard to potential for emissions to air;

- Care should be taken to avoid delivering materials to silos at a rate which 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 air flow is increased;

- All new silos should be fitted with an automatic system to cut off delivery in the event of pressurisation or overfilling. Use of alternative techniques may be acceptable provided that they achieve an equivalent level of control with regard to potential for emissions to air.

Stockpiles and ground storage

5.9 Clays usually contain sufficient moisture to prevent problems of emissions of dust to the atmosphere when removed from the clay pit. However, the movement of clay and stockpiling may, particularly in dry weather, result in drying and disintegration. Measures such as water spraying may be necessary to prevent, or, where that is not practicable, to minimise dust emissions to the air.

5.10 Consideration should be given to the siting of aggregate stockpiles, based upon such factors as the prevailing winds, proximity of site boundary and proximity of neighbours. Minimisation of drop height is very important in stockpiling to reduce wind whipping of particulates. When designing storage bays, internal walls separating storage bays should be at least ½ metre lower than external walls of the bays.

- Storage areas where there is vehicular movement should have a consolidated surface which should be kept in good repair.

- To control dust emissions, storage bays should be used where practicable. Stock should not be piled higher than the external walls of the bay and should not be forward of the bay.

- Stockpiles should be wetted where necessary to minimise dust emissions. Fixed water sprays should be installed for long term stocking areas if appropriate.

Conveying

5.11 There are various ways of keeping conveyor belts and the surrounding areas clean. For example, where chevron belts are used, catch plates may be fitted to contain dust falling from the underside of the belt at the turning point. From a health and safety perspective this is not always possible and hoses and sprinklers is a possible alternative. New conveyors can be designed to minimise free fall at discharge points. A chute, or similar equipment, at the point of discharge from a conveyor reduces dust arising. Arrestment plant might be a suitable control option if dusty emissions arise from conveyor transfer points. The conditions relating to conveyors should not be applied where material has been screened to remove particles under 3 mm in size, unless visible dust emissions have been observed from the conveyors. The following conditions should only be applied where emissions to the external environment are likely to arise:

- Where dusty materials are conveyed, the conveyor and any transfer points should be provided with adequate protection against wind whipping;
- Conveyors should be fitted with means for keeping the belt clean;
- Conveyor belts should not be overloaded;
- Where the free fall of material gives rise to external dust emissions, techniques should be used at the point of discharge to minimise this;
- Planned preventative maintenance schedules should include conveyor systems.

Process operations

5.12 Emissions from the process operations covered by this note comprise nitrogen oxides (from combustion), fine particulate matter, sulphur oxides, chlorides and fluorides. The control of dust emissions from process handling operations is mainly by the use of enclosures. Containment and arrestment is generally preferred to dust suppression techniques. The potential for fugitive emissions is reduced by minimising airborne dust from internal transport. Emissions from combustion may be controlled by the use of low NOx burner technology and low sulphur fuels. Fluoride emissions are controlled by in furnace process optimisation or by the use of scrubbers. ETBPP guidance note GG166 provides detailed information relating to these techniques.

- All crushing, grinding, screening or drying plant should be fitted with an efficient means for the control of dust emissions to meet the standards. The flow of air through crushing, grinding or screening plant should be minimised. The free fall of the product should also be minimised.

Techniques to control fugitive emissions

Fugitive emissions

5.13 Fugitive dust emissions should be prevented whenever practicable. When this is not practicable emissions should be controlled at source by measures agreed between the regulator and the operator. Examples include correct storage of raw materials, organising the process in such a way that spillage is avoided, and maintaining high standards of internal and external housekeeping. To make buildings as dust tight as necessary to prevent visible emissions, self-closing doors and close-fitting entries and exits for conveyors are among the options that may be used. 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. If necessary, emissions should be controlled and abated using suitable arrestment equipment.

- All process buildings should be made as dust tight as is necessary to prevent visible emissions;
- All process buildings should be cleaned regularly, according to a written maintenance programme, to minimise fugitive emissions;
- All new buildings housing processing machinery should be externally clad with materials that can be readily cleaned;
- Where local exhaust ventilation is used, emissions should be ducted to suitable arrestment plant;
- Dusty wastes should be stored in closed containers;
- The method of collection of product or waste from dry arrestment plant should be such that dust emissions are minimised. The preferred removal of fine, dry waste from arrestment equipment should be by return into the product. Where the material is to be disposed of then the preferred removal system should be wet. Where a dry system is used, the material should be discharged into closed vessels fitted with an effective dust collection system with consideration being given to its final mode of disposal;
- A high standard of housekeeping should be maintained;
- All spillages which may give rise to dust emissions should be cleaned up promptly, normally by wet handling methods. Dry handling of dusty spillages should not be permitted other than in fully enclosed buildings (NB Dry handling of dusty spillages within fully enclosed buildings may not be acceptable under COSHH). Major spillages may be dealt with using a vacuum cleaning system. It should not normally be necessary for a vacuum cleaning system to be available on site at all times, provided that such equipment can be obtained in the event of a major spillage on the same day that it occurs, and measures to minimise emissions, such as dampening, are taken immediately.

Loading and unloading

5.14 Best practice in the transportation and handling of dusty materials is by methods which prevent or, where that is not practicable, minimise emissions to the air, for example by pipeline. The handling, transporting and stocking of finished goods may also give rise to dust emissions to the air if due care is not taken.

- The loading and unloading of road vehicles and trains should be carried out so as to minimise dust emissions;
- Road transport for dusty materials should be carried out in closed tankers or sheeted vehicles;
- Transfer points of dusty materials should be enclosed and ducted to suitable arrestment equipment, as approved by the regulator.

Roadways and vehicles

5.15 In designing a new process, minimising vehicle movement in the site layout will enable better control of roadways with the potential for fugitive emissions.

5.16 Vehicle exhausts directed above the horizontal are preferred as these avoid the impact of the exhaust raising dust when travelling on internal roadways.

5.17 On some sites wheel-cleaning facilities may be useful to prevent dust being carried off the site. Where the plant is co-located with a quarry which has wheel wash and underbody wash facilities available, these might be used where necessary. If a plant is co-located with a quarry which does not have wheel-wash facilities, it may not be appropriate to install them.

Vehicles may also be effectively cleaned, prior to leaving site, with a brush and hose. Sometimes the presence of a long access road ensures that any dust falls off the vehicles and does not reach the public highway. Hard surfacing for roadways should normally comprise compacted stone chippings between the loading points and the wheel wash (where present), and macadam or concrete for the final section of road leading to the public highway. Sweeping, wetting or sealing are all techniques that may be used to reduce dust emissions from roads.

The technique that should be used depends upon the type of road under consideration.

- Roadways in normal use and any other area where there is regular movement of vehicles should have a hard surface capable of being cleaned or kept wet. They should be kept clean or wet, in order to prevent or minimise dust emissions. They should be adequately drained to avoid ponding of water. They should be kept in good repair. This provision only applies to roads inside a working quarry to the extent that they form part of an installation. (Guidance on the meaning of “installation “ can be found in Annex III of the “General Guidance Manual”);

- Where necessary to prevent visible dust being carried off site, wheel-cleaning facilities should be provided and used by vehicles before leaving the site.

Air Quality

Dispersion & Dilution

5.18 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, 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.

5.19 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.

Ambient air quality management

5.20 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

5.21 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.

5.22 When dispersion of pollutants discharged from the stack (or vent) is necessary, the target exit velocity should be 15m/sec 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.

5.23 An exception to the above 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 9 m/sec.

To reduce the potential of droplet emissions a mist eliminator should be used. Where a linear velocity of 9m/sec 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

5.24 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

5.25 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.

5.26 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

5.27 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

5.28 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 below 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
1. Introduction			
	Simplification of text	Make Note clearer	
	Addition of links	Change to electronic format	Removes need for extensive footnotes/references
4. Emission limits, monitoring and other provisions			
	Removal of redundant paragraphs		
5. Control techniques			
Air Quality	Clarification of exhaust velocity requirements		

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. Regulators may be willing to provide assistance and ideas, although cannot be expected to act as unpaid consultants.

Health and safety

Operators of processes and 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 - Application form

Application for a permit for a heavy clay goods and refractory goods manufacturing installation

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

When to use this form
Use this form if you are applying for a permit to a Local Authority to operate a heavy clay goods and refractory goods manufacturing 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 H 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

A The basics

A1 Name and address of the installation (not required for mobile plant)

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.

No ☐ Yes ☐

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 What activities are, or will be, carried on at the installation? Please include "directly associated activities" (this term is explained in Annex lll in Part B of the general guidance manual.

B2 Do you make bricks, tiles, pavers or pipes ?

☐ Yes ☐ No

B3 Do you make refractory products?

☐ Yes ☐ No

If you have answered 'yes' to B3 the installation is not suitable for a simple permit.

B4 Why is the application being made?

☐ new installation

☐ change to existing installation means it now needs a permit

B5 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/ 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: _____

B6 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 - where the installation includes at least one burner of 20MW or more
- 1km otherwise ☐ No ☐ Yes

If 'yes', is the installation likely to have a significant effect on these sites and, if so, 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)

B7 **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 **<u>The details</u>**

C1 **Which of the following kilns do you operate?** *(tick all that apply)*

a) continuous kilns ☐
b) intermittent (batch) kilns ☐
c) scotch kilns ☐
d) other – *please describe*: _____

C2 **Do you operate kilns with a net rated input of**:

(tick all that apply) *[informs Table 1]*

a) between 2MW and 20MW? ☐
b) less than 2MW ☐
c) over 20MW ☐

C3 **Do you use any of the following fuels?** *(tick all that apply)* *[informs stack height]*

a) heavy fuel oil ☐
b) gas oil ☐
c) gas ☐
d) processed fuel oil ☐
e) other waste derived fuel ☐
f) other (give details): _____

C3 **Do you have arrestment equipment with exhaust flow:** *[informs Table 1]*

a) greater or equal to 300m3/min? ☐ Yes ☐ No
b) greater than 100m3/min but less than 300m3/min ☐ Yes ☐ No
c) less than 100m3/min ☐ Yes ☐ No

C4 **Do you use clays that are ≤ 0.12%w/w sulphur?** *[informs Table 1]*

☐ Yes ☐ No

C5 **Do you have continuous monitors to show compliance with a numerical limit in Table 1 of the Model Permit?** *[informs condition 2]*

☐ Yes ☐ No

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

a) visible ☐ Yes ☐ No

b) audible ☐ Yes ☐ No

c) alarm activation recorded automatically ☐ Yes ☐ No

d) is a trigger level set ☐ Yes ☐ No

At what percentage of the emission limit is the value set? _____%

Have you undertaken isokinetic sampling at least once to demonstrate compliance with the numerical limit in Table 1?

☐ Yes ☐ No

Note: "dusty material" should be taken to be any material which can be wind-entrained. It excludes, for example, >3mm material and scalpings.

C6 **In which of the following facilities will dusty raw materials or waste be stored?** (*tick all that apply)* *[informs conditions 4, 6]*

a) silo ☐

b) bulk storage tank ☐

c) within a building ☐

d) in fully-enclosed containers/packaging ☐

e) stockpiles ☐

f) other - *please specify*: _____

C7 **Do you have pneumatic transfer of materials?** *[informs condition 6-8]*

☐ Yes ☐ No

If yes, will displaced air from pneumatic transfer be: (*tick all that apply)* *[informs condition 6-8]*

a) vented to arrestment plant ☐ Yes ☐ No

b) back-vented to a road tanker ☐ Yes ☐ No

c) other - please specify: _____

If yes to C7, do deliveries automatically stop for *[informs condition 6]*

a) over-filling ☐ Yes ☐ No

b) over-pressurisation ☐ Yes ☐ No

If yes to C7, does the displaced air pass through abatement plant prior to emission to air? *[informs condition 8]*

☐ Yes ☐ No

C8 **For any raw materials or waste covered in Question C6, what facilities will be provided for their storage?** (t*ick all that apply)*

[informs condition 4]

a) hopper wind-protected on at least 3 sides ☐

b) storage bay without suppression & stockpiles lower than retaining walls ☐

c) storage bay with suppression ☐

d) fully-enclosed stores ☐

e) other - *please specify*: _____

C9 **Will any material be stored in the open (unenclosed) other than material wholly comprised of one or more of the following: >3mm material, conditioned crusher-run or blended material?** *[informs condition 4]*

☐ Yes ☐ No

C10 **How do you manage dust emissions from stockpiles? ?**

(t*ick all that apply)* *[informs condition 4]*

a) water sprays ☐

b) strategic siting of stockpiles ☐

c) minimisation of drop heights ☐

d) other (*please specify*): _____

C11 **Do you have conveyors:** *[informs condition 9]*

☐ Yes ☐ No

C12 **If yes, which of the following facilities will be provided to convey any dusty material and waste** (*tick all that apply)* *[informs condition 9]*

a) deep trough ground-level conveyor ☐

b) fully-enclosed conveyor ☐

c) pneumatic handling system ☐

d) bucket elevator ☐

e) wind boards ☐

f) other – *please specify:* _____

C13 Which of the following methods will be used to minimise emissions at conveyor transfer points, including free fall of material?

(tick all that apply) *[informs condition 9]*

a) enclosed ☐

b) enclosed and ducted to arrestment equipment ☐

c) fitted with a chute ☐

d) other - *please specify:* _____

C14 Which of the following techniques will be used to clean conveyors?

(tick all that apply) *[informs condition 9]*

a) belt scrapers ☐

b) catch plates ☐

c) other techniques for keeping the return belt clean and collecting the material removed by the cleaning, *please specify:*

_____

C15 How will potentially dusty materials (including any raw materials, finished products and waste), arrive at or leave the site? *(tick all that apply)*

[informs condition 10]

	Raw Materials	**Finished Products**	**Waste**
Road			
Rail			
Other			

C16 How will potentially dusty materials, (including any raw material, finished products and waste) be transported within the site?

(tick all that apply) *[informs condition 17]*

a) fully-enclosed transport ☐

b) 'canopied' rail wagons ☐

c) sheeted transport ☐

d) water suppression applied to the transported material ☐

e) aqueous polymer suppression applied to the transported material ☐

f) bagged ☐

g) other – *please specify*: _____

C17 Which of the following techniques do you use to control fluorides?

a) in-process optimisation ☐ *[informs Table 1]*

b) abatement ☐

C18 If you use in-process optimisation to control fluorides, do you comply with the limit in Table 1 of the Model Permit? *[informs Table 1]*

☐ Yes ☐ No ☐ n/a (fluorides are controlled by abatement)

C19 Do you have any quarry roads as part of the installation?

☐ Yes ☐ No *[informs condition 12]*

C20 Which techniques will you use to ensure that vehicles do not track material onto the highway? *[informs condition 12]*

a) body and wheel wash ☐

b) wheel wash ☐

c) hose and brush ☐

d) sufficient distant to the site boundary on sealed road before leaving site ☐

e) other, *please describe:* _____

C21 Do you have environmental management procedures and policy?

[informs conditions 3, 15, 16]

☐ Yes ☐ No

D Anything else

Please tell us 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.

F Protection of information

F1 Any confidential or national security info 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 etc 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).

H 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 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: _____

Appendix 2 - Model Permit

This appendix contains a model permit for heavy clay installations – see para 1.6 of this note and para 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 arrestment 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 18 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 in the plan attached to this permit.

Activity description

The operator (**A**) is authorised to operate the activity[4] at the installation (**B**) subject to the following conditions.

Conditions

Emissions and monitoring

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

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

   Any monitoring display required for compliance with the permit shall be visible to operating staff at all times. 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.

   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 arrestment 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.*

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

Where odour arrestment equipment is installed: The odour arrestment equipment shall be inspected not less than once a day for at least the following: a) leaks or blockages in air handing equipment, ductwork and arrestment equipment; b) continuous monitors for arrestment equipment; and c) surface cracking, voids, leaks, compaction, moisture content, and plant/weed growth on biofilters.

3. 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.*

Storage of Raw Materials (including dusty waste)

4. Raw materials (including dusty materials and dusty wastes) [and clay] shall only be stored in [specify storage location] as detailed on the plan attached to this permit and shall be subject to suppression and management techniques to minimise dust emissions

Silos *where used*

5. [Sand] shall only be stored within the [sand] silos.

6. Dust emissions from loading or unloading road tankers shall be minimised by [venting to specify type arrestment plant] [backventing to a road tanker fitted with an on-board, truck-mounted relief valve and filtration system] and by connecting transfer lines first to the delivery inlet point and then to the tanker discharge point, and by ensuring delivery is at a rate which does not pressurise the silo. [When loading x silo, deliveries must automatically stop where overfilling or over-pressurisation is identified.]

7. Silos and bulk containers of dusty materials shall not be overfilled and there shall be an overfilling alarm.

8. Displaced air from pneumatic transfer shall pass through abatement plant prior to emission to air.

Conveying

9. All dusty materials, including wastes, shall be conveyed using [specify conveyor, level of enclosure and enclosure type]. All transfer points shall be fitted with [specify dust control technique].

Loading, unloading of road vehicles and trains

10. No potentially dusty materials (including wastes) shall arrive on, or leave, the site other than by use of [specify transport type and dust control technique].

Roadways and transportation

11. All areas where there is regular movement of vehicles shall have a consolidated surface capable of being cleaned, and these surfaces shall be kept clean, or kept wet, and in good repair. Quarry haul roads are excluded from this provision.

12. Vehicles shall not track material from the site onto the highway.

Techniques to control fugitive emissions

13. The flow of air through crushing, grinding or screening plant should be minimised. The free fall of the product should also be minimised.

14. *(select according to visible dust potential of each process building)*. The fabric of process buildings shall be maintained so as to minimise visible dust emissions.

Records and training

15. Written or computer records of all tests and monitoring shall be kept by the operator for at least [ ] months. They [and a copy of all manufacturers' instructions referred to in this permit] shall be made available for examination by the Council. *Records shall be kept of operator inspections, including those for visible and odorous emissions.*

16. 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 next two conditions will not automatically apply and need specific inclusion in the permit where required.

Best available techniques

17. 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.

18. 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.

Table 1 - Emission limits, monitoring and other provisions					
Row	**Substance**	**Source**	**Emission limits / provisions**	**Type of monitoring**	**Monitoring frequency**
1	Particulate matter	Kilns with a net rated thermal input of 2MW or more.	100 mg/m^3	Isokinetic monitoring	Annual
2	Particulate matter	Kilns with a net rated thermal input of less than 2MW.	Should not exceed the equivalent of Ringelmann shade 1	Operator observations	At least daily when the kiln is in operation
3	Particulate matter	All emissions to air Silos new since July 1st 2004	No visible emission Designed to emit less than 10mg/ m^3	Operator observations	At least daily
4	Particulate matter	Arrestment equipment with exhaust flow >300 m^3/min (other than from kilns and silo arrestment plant). (see note e)	50 mg/m^3	Indicative monitoring	Continuously recorded
				Isokinetic sampling	At least once to demonstrate compliance, then as necessary to provide a reference for the continuous indicative monitor
5	Particulate matter	Arrestment equipment with exhaust flow >100 m^3/min (other than from kilns and silo arrestment plant). (see note e)	Designed to achieve 50 mg/m^3	Indicative monitoring to demonstrate that the arrestment equipment is functioning correctly.	Continuous
6	Particulate matter	Arrestment equipment with exhaust flow <100 m^3/min (other than silo arrestment plant). (see note e)	No visible emission.	Operator observations **OR** Indicative monitoring to show that the equipment is functioning correctly	At least daily **OR** Continuous
7	Oxides of Nitrogen (measured as nitrogen dioxide)	All new or substantially changed processes (with a net rated thermal input of 2MW or more).	500 mg/m^3.	Annual manual extractive test.	Annual.

8	Chloride (expressed as hydrogen chloride)	All new or substantially changed processes (with a net rated thermal input of 2MW or more).	50 mg/m^3	Manual extractive test	Annual
9	Fluoride (expressed as hydrogen fluoride)	All kilns (with a net rated thermal input of 2MW or more).	10 mg/m^3	Manual extractive test.	Annual
10	Sulphur dioxide	New or substantially changed plant (with a net rated thermal input of 2MW or more) where low sulphur clays are used (</= 0.12% w/w sulphur)	500 mg/m^3	Extractive test	Annual
11	Sulphur dioxide	New or substantially changed plant (with a net rated thermal input of 2MW or more) where high sulphur clays are used (>0.12% w/w sulphur)	2000 mg/m^3	Extractive test.	Annual
12	Sulphur dioxide (see note d)	All activities using heavy fuel oil or other residual type/comparable Quality Protocol Processed Fuel Oil	1% wt/wt sulphur in fuel	Sulphur content of fuel is regulated under the Sulphur Content of Liquid Fuels Regulations	
13	Sulphur dioxide (see note d)	All activities using gas oil/ comparable Quality Protocol Processed Fuel Oil	0.1% wt/wt sulphur in fuel	Sulphur content of fuel is regulated under the Sulphur Content of Liquid Fuels Regulations	
14	Droplets, persistent mist and fume	All emissions to air (except steam and condensed water vapour)	No droplets, no persistent mist, no persistent fume, no visible smoke	Visual observations	

Notes:

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.

a) The reference conditions for limits in Table 1 are: 273.1K, 101.3kPa, without correction for water vapour content, unless stated otherwise, except for kiln emissions, where the reference conditions should be normalised to 18% oxygen measured dry, averaged over the firing cycle of the kiln.

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

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

d) Activities burning waste oil not covered by the quality protocol processed fuel oil must comply with the Waste Incineration Directive (WID).

e) Where the plant is discharging to the external atmosphere.

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.