Environmental permitting technical guidance PG5/1(21)

Reference document for the incineration or combustion of waste wood

1 Legal status

1.1 This technical guidance applies to the whole of the UK. It is issued by:

- the Secretary of State for Environment, Food and Rural Affairs
- Welsh Ministers
- the Scottish Government
- the Department of Agriculture, Environment and Rural Affairs in Northern Ireland (DAERA).

1.2 This is issued as guidance in Scotland and as statutory guidance in:

- England and Wales under regulation 65(1) of the Environmental Permitting (England and Wales) Regulations 2016
- Northern Ireland under regulation 41(1) of the Pollution Prevention and Control (Industrial Emissions) Regulations (Northern Ireland) 2013 Regulations

If there is an appeal against a decision made under this legislation, this guidance will be taken into account when making a judgement.

1.3 This technical guidance replaces PG1/12(13). Statutory guidance for combustion of waste wood.

2 Scope

2.1 England and Wales

This guidance applies to activities described in Schedule 1, Part 2, Chapter 5, Section 5.1, Part B, (a) (v) of the Environmental Permitting (England and Wales) Regulations 2016. That is the incineration in a small waste incineration plant with an aggregate capacity of 50kg or more per hour of wood waste with the exception of wood waste which may contain:

- halogenated organic compounds
- heavy metals as a result of treatment with wood preservatives or coatings

Scotland

This guidance applies to the activity described in Schedule 1, Part 1, Chapter 5, Section 5.1 of the Pollution Prevention and Control (Scotland) Regulations 2012. That is the incineration of biomass waste in an incineration or co-incineration plant with a capacity of more than 50kg per hour and equal to or less than 3 tonnes per hour.

Northern Ireland

This guidance applies to the activity described in Schedule 1, Part 1, Chapter 5, Section 5.1 of the Pollution Prevention and Control (Industrial Emissions) Regulations (Northern Ireland) 2013. That is:

- the incineration of non-hazardous solid or liquid waste in an excluded plant but which has a capacity of 50 kg or more per hour but less than 1 tonne per hour
- wood waste with the exception of wood waste which may contain halogenated organic compounds or heavy metals as a result of treatment with wood preservatives or coating, and which includes in particular such wood waste originating from construction and demolition waste

2.2 This guidance does not apply to plants with a capacity of 3 tonnes or more per hour (or 1 tonne or more per hour in Northern Ireland). These should be permitted:

- England and Wales as a Section 5.1 Part A(1)(b) activity
- Scotland as a 5.1 Part A(c) activity
- Northern Ireland as a Section 5.1 Part A(c) or (g) activity

2.3 In England and Wales, Section 5.1, Application of Part B, paragraph 1 of the Environmental Permitting Regulations (EPR) says that when determining the extent of an installation, any location where the activity's wastes and residues to be incinerated are stored or handled is to be ignored.

Therefore, this guidance applies only to the:

- incineration or combustion process itself
- immediate storage of bottom ash.

This guidance does not apply to:

- storage, handling or pre-treatment of waste wood
- any downstream post-treatment of bottom ash
- any activities within the scope of Chapter IV of the EU Industrial Emissions Directive (2010/75/EU) (IED)
- waste wood, other than that specified in table 4.1 (incineration of this must be carried out in a plant compliant with Chapter IV of the IED)

Operators must speak to their national regulator to obtain a separate waste operation permit, exemption or regulatory position for these activities, except where they are storing their own arisings of wood waste (for example as part of a Section 6.6 Part B permit). In this case, the 2 activities should come under 1 permit.

The operator must also meet their duty of care obligations for any wastes they receive under section 34 of the Environmental Protection Act 1990.

2.4 Other than those described in 2.6, all 5.1 Part B plants of 1MW rated thermal input or more are within the scope of the Medium Combustion Plant Directive (2015/2193/EU) (MCPD). The requirements of MCPD are covered in section 4 'summary of best available techniques' and section 5 'emission limits, monitoring and other provisions' of this guidance. Where the emission limit values (ELVs) and monitoring requirements of the previous guidance are more stringent than MCPD, these have been retained.

2.5 Other than those described in 2.6, all new plants of 1MW rated thermal input or more need to comply with the new plant requirements of MCPD.

For plants in operation before 20 December 2018 with a rated thermal input:

- of more than 5MW - comply with MCPD requirements for existing plant from 1 January 2025
- between 1MW and 5MW - comply with MCPD requirements for existing plants from 1 January 2030

2.6 Where the gaseous products of the combustion are used for the direct heating, drying or any other treatment of objects and material (criteria in Article 2(3) of the MCPD) – MCPD does not apply but plants must still have a Part B permit.

MCPD does not apply to post-combustion plants designed to purify the waste gases from industrial processes by combustion and which are not operated as independent combustion plants. Sometimes waste wood is transferred in a closed system by air from a woodworking process, through a cyclone directly to a storage hopper for automated feed into a furnace, where the combustion

of the waste wood is an integral part of the arrestment plant for woodworking processes. However, such plants may still need a Part B permit – contact your regulator for advice.

2.7 The regulator for plants subject to MCPD is the:

- Environment Agency in England
- Natural Resources Wales (NRW) in Wales

The regulator for plants not subject to MCPD, in either England or Wales, is the local authority.

In Scotland, the regulator for all plants is the Scottish Environment Protection Agency (SEPA).

In Northern Ireland, the regulator is the:

- Northern Ireland Environment Agency (NIEA) for plants on a Part A or B installation
- relevant district council for all other plants (Part C)

In England and Wales, if the MCP is part of a Part B (for example timber activity) or Part A(2) installation, the installation needs 2 environmental permits:

- one from the EA or NRW for the MCP
- one from the local authority for the Part B or Part A(2) activities (minus the MCP)

In Northern Ireland, if the MCP is not part of a Part A or Part B installation, the operator needs 2 permits:

- one from the district council where the MCP is located
- one from the Chief Inspector (NIEA) for the Part A or Part B activities

2.8 In this guidance, the rated thermal input is taken to mean the net rated thermal input. That is the rate at which fuel can be burned at the maximum continuous rating of the appliance multiplied by the net calorific value (or lower heating value) and expressed as megawatts thermal.

The relationship between throughput and the thermal input and output of a burner is dependent on:

- the calorific value of the fuel
- the efficiency of the appliance

As a guide, Table 2.1 shows this relationship based on a wood waste net calorific value of 16 KJ/kg and an 85% efficiency. However, the operator should supply accurate information based on their own appliance.

Table 2.1: Comparison of maximum burn rate and net rated thermal input and output

Max burn rate	Net rated thermal input	Thermal output
50 kg/hr	222 kW	189 kW
90 kg/hr	400 kW	340 kW
225 kg/hr	1MW	850 kW
1125 kg/hr	5 MW	4.25 MW
3 T/hr	13.33MW	11.33MW

2.10 Ordinarily energy recovery from 5.1 Part B combustion plants is in the form of heat either as steam or hot water. While it is possible that heat can be subsequently converted into electricity, this is not normally the case for these types of plant. Therefore, this has not been covered in this guidance.

If a 5.1B combustion plant is used to generate electricity, operators in England, Wales and Northern Ireland should consult their regulators on the applicability of the Specified Generator controls in Schedule 25B of the EPR. In England and Wales, operators should seek the advice of the Environment Agency (EA) or NRW.

3 General conditions

3.1 This guidance describes what are considered the best available techniques (BAT) for those activities within its scope. This guidance also details any mandatory requirements affecting air emissions. Unless otherwise stated, the provisions of this guidance are generally applicable.

3.2 The techniques in this guidance are neither prescriptive nor exhaustive. Other techniques may be used as long as they ensure at least an equivalent level of environmental protection.

3.3 Sections 4 and 5 set out a number of matters that should be considered for inclusion as permit conditions.

3.4 After assessing BAT and the environmental impact of emissions to air, permit conditions, including emission limit values, may need to be tighter than those set out in this guidance. In individual cases, it may be justified to:

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

4 Summary of best available techniques

4.1 Acceptable waste to be burnt

4.1.1 Only clean wood waste, as described in 4.1.2, should be incinerated or combusted in a 5.1 Part B appliance.

4.1.2 All movement of waste (including wood waste) must be accompanied by a note, including:

- a written description of the waste signed by you and the person you are buying from or selling to
- the waste classification code

This is a Duty of Care legal requirement. See a full list of waste codes in Commission Decision 2000/532/EC as amended by Commission Decision 2014/955/EU. Only those waste codes shown as restricted in Table 4.1 are to be incinerated or combusted.

Table 4.1: Acceptable waste codes

European Waste Classification Codes	Description	Further restriction
02 01 03 02 01 07	Plant tissue waste from agriculture, horticulture and forestry	-
03 01 01	Waste bark and cork from wood processing and the production of panels and furniture	No chemical treatments applied
03 01 05	Sawdust, shavings, cuttings, wood, particle board and veneer that is fixed to the board, other than those mentioned in 03 01 04	No chemical treatments applied
03 03 01	Waste bark and wood from pulp, paper and cardboard production and processing	No chemical treatments applied
15 01 03	Wooden packaging	Visibly clean wooden packaging, including pallets, no chemical treatments applied
19 12 07	Wood other than wood containing hazardous substances (19 12 06) from waste management facilities	Source segregated visibly clean single waste wood streams such as pallets, where no chemical treatments have been applied.
		Post-segregation of mixed waste wood streams from civic amenity sites or skip

		hire operators is not sufficient

Any waste wood that has been classified as hazardous waste, or that's come from construction and demolition works, (commonly known as Grade B, C & D waste wood within the industry), must not be incinerated or combusted in a 5.1 Part B appliance.

In Scotland, further information can be found in the SEPA Permitting Guidance for biomass combustion.

4.2 Plant design and operation

More information on plant design and operation is given in sections 4.2 and 4.3 of technical guidance PG1/1(21).

4.2.1 Variation in fuel size and moisture content limits the ability of combustion control systems to give good combustion. Fuel with a narrow size and moisture distribution burns much better than mixed-size fuels or fuel of variable moisture level. Operators should:

- store fuel under cover to keep fuel dry
- store and feed different waste wood types (for example offcuts, briquettes, woodchips and dust) separately to improve control of combustion conditions

4.2.2 Continuous feed produces better combustion than stop-start burning (where the amount of fuel fed into the combustion chamber is controlled automatically and balanced with the amounts of primary and secondary air to complete the combustion process). Automatic fuel feed systems prevent the emission of smoke fumes and reduce the emission of other pollutants. For existing processes, use automatic feed systems wherever practical. For new processes, use automatic fuel feed systems.

4.2.3 On start up from cold, before waste wood is put into the furnace, raise the combustion zone temperature, using an ancillary burner fired by natural gas, gas oil, or virgin wood. Do not burn waste wood during the start up from cold.

When the burner is idling, carbon monoxide concentrations can rise significantly. While in many cases it is technically feasible to prevent idling, in a few cases it may only be possible to minimise it. Where this is not technically feasible, operators must justify this to the regulator

4.2.4 Good combustion requires good management and control of a number of parameters:

- fuel content and its rate of feed
- primary and secondary air
- temperature in the combustion chamber and the heat exchanger

- oxygen levels

4.2.5 Good control of air flow is essential to thermal efficiency. More air than the theoretical minimum is required for stable combustion and to prevent the formation of carbon monoxide (CO). Excess CO is a good indicator of incomplete combustion. Too much excess air will increase the carryover of dust and lower temperature, resulting in a loss of thermal efficiency.

Some biomass combustion plants may have re-circulated flue gases to ensure optimum combustion, with minimum excess air. Flue gas recirculation will also help reduce emission of nitrogen oxides (NO_X).

4.2.6 Normally, the combustion gases are then directed into a boiler section to produce hot water, steam or heat thermal fluid (for example hot oil). The energy produced might be used for process heat, building or district heat, electricity or for combined heat and power. A good turndown ratio (that is the ratio between maximum and minimum firing rates, over which emission parameters can be satisfied) will enable greater thermal efficiency by better matching the heat requirement with the waste wood feed rate.

More information on plant design and operation is given in section 4.2 ‘Control techniques for biomass combustors’ and 4.3 ‘Techniques to control emissions from storage and handling of fuels and ash’ of the environmental permitting technical guidance PG1/1(21).

4.3 Multiple plants

4.3.1 In determining whether or not multiple appliances should be treated for permitting purposes as a single plant, regulators should consider answering:

- Could the function of the appliances be done by a single larger appliance?
- Are the appliances fed from the same fuel storage silo?
- Are the appliances connected to a common indirect heating system?
- Are the appliances all associated with the same business activity?

Where multiple appliances are not permitted as a single plant, justify this on the basis of the site-specific requirements and not as a way to avoid regulation through disaggregation.

4.4 Air quality, dispersion and dilution

4.4.1 Pollutants emitted via a stack need sufficient dispersion and dilution in the atmosphere. This ensures that they do not ground at concentrations which may be harmful to human health or the quality of the environment.

4.4.2 Emissions to air should be free from dark smoke (see Tables 5.2 to 5.5) and from offensive odour outside the site boundary, as perceived by the regulator. This can be achieved by good combustion.

4.4.3 All new and replacement plants must submit an air quality report detailing the long-term and short-term process contribution as part of their application. The process contribution can be calculated using the guidance on Air risk assessment for your environmental permit.

4.4.4 Emissions from the permitted process must not cause or contribute to:

- EU air quality limit values being exceeded
- the values within the objectives of the Air Quality Strategy for England, Scotland, Wales and Northern Ireland for sulphur dioxide, oxides of nitrogen and particulate matter (PM_{10} and $PM_{2.5}$).being exceeded

4.4.5 The regulator will impose tighter emission limits than those set out in tables 5.2 to 5.5 if:

- air quality standards or objectives are being breached or are in serious risk of breach
- it's clear from the air quality report or detailed review and assessment (for existing installations) that the permitted process itself is a significant contributor to the problem, (see paragraph 4.4.6)

The need for tighter emission limits might be offset, fully or in part, by increasing the stack height or exit velocity.

4.4.6 Ensure that the process contribution is no more than 1% of the relevant long-term Environmental Quality Standard (EQS) and/or 10% of the relevant short-term EQS at sensitive receptors.

Where this cannot be demonstrated through simple calculations, (for example the air risk assessment in paragraph 4.4.3), the operator will need to use computer-based air dispersion models, for example ADMS (Advance Dispersion Modelling System), AERMOD (Atmospheric Dispersion Modelling) or some form of intermediate screening tool.

When calculating the impact of particulate emissions (PM_{10} and $PM_{2.5}$), data on particle size distribution of dust emissions may be needed. Otherwise, assume that all the dust emissions are present as PM_{10} or $PM_{2.5}$.

4.4.7 To ensure dispersion is not impaired by either low exit velocity at the point of discharge or deflection of the discharge:

- the stack exit should be vertical
- do not use a cap or other restriction

A cone may sometimes be useful to increase the exit velocity to achieve greater dispersion.

4.4.8 Where necessary, the regulator will include the minimum stack height or exit velocity within the environmental permit.

4.5 Abatement

4.5.1 Good combustion techniques minimise dust emissions. Dust includes emissions of particulate matter of all particle sizes, for example PM_{10} and $PM_{2.5}$). Poor combustion control, for example high temperatures and insufficient oxygen, will increase dust emissions.

Where necessary, in order to reduce dust emissions to air to meet ELVs, operators must install abatement. Table 4.2 shows techniques that can be deployed either individually or collectively depending on the level of abatement required.

Table 4.2: Dust performance rates

Technique	Performance
Cyclones (multicyclones)	Emissions from cyclones and multicyclones will be dependent on the flow rate of the exhaust gas and the characteristics of the dust.
Electrostatic precipitators (ESP)	< 60mg/m^3
Fabric filters (bag house)	< 10mg/m^3
Ceramic filters	< 10mg/m^3

More information on the abatement of emissions to air is given in section 4.1 'Control of emissions to air' of the environmental permitting technical guidance PG1/1(21).

4.6 Emission testing

4.6.1 Where annual emissions testing is required, the operator must have suitable and sufficient monitoring locations for testing. Guidance on testing locations is in the Environment Agency's Technical Guidance Note (Monitoring) M1: Sampling requirements for stack monitoring. The operator is advised to work with an emissions testing company before applying for a permit to ensure emissions monitoring can be carried out.

Operators who comply with the Environment Agency's Monitoring Certification (MCERTs) scheme for environmental permit holders, will meet the monitoring requirements of this guidance.

4.6.2 If considered necessary, the regulator should include permit conditions detailing the requirements for periodic emissions testing, for example design and access.

4.6.3 Where emissions monitoring is required but cannot be safely or correctly carried out, the regulator should refuse the permit.

4.7 Management

4.7.1 Effective management is central to environmental performance; it's an important component of BAT and in complying with permit conditions.

Operators of installations should put in place a structured Environmental Management System (EMS) to cover:

- cleaning and maintenance
- staff training
- plant operation
- waste acceptance criteria
- bottom ash storage and disposal
- emissions monitoring
- plant failures
- record keeping

If the operator already has accreditation to a published standard (such as ISO 14001), they do not need to set up a separate system. Regulators should use their discretion, in consultation with individual operators, to agree the appropriate level of EMS for the nature and size of the particular process.

4.8 Cleaning and maintenance

4.8.1 Effective preventative maintenance and cleaning is important to comply with emission limits.

4.8.2 Clean flues and ductwork regularly to ensure that a build-up of material does not affect emissions and their dispersion.

4.8.3 Maintain all aspects of the process, including all plant, buildings and equipment, in line with manufacturer's recommendations. Where there are no manufacturer's recommendations, the operator should develop their own maintenance procedures.

4.9 Training and operation

4.9.1 All plants should be operated in accordance with the manufacturer's operating manual to minimise the risk of emissions. Where there is no manufacturer's operating manual, develop your own operating procedures which should include procedures on how to deal with plant failures.

4.9.2 Only trained staff must operate the plant.

4.10 Waste acceptance criteria

4.10.1 The operator must have procedures in place to ensure that only waste wood listed in Table 4.1 is incinerated/ combusted.

4.10.2 Where an operator is incinerating or combusting their own waste wood arisings, they must demonstrate that the waste wood conforms to that in table 4.1.

4.10.3 All imported waste wood must be accompanied by the relevant written information, as set out in 4.1.2, which will:

- include the European Waste Classification Code
- show that the wood is untreated
- show that the wood has been kept separate from wood that might contain halogenated organic compounds or heavy metals as a result of treatment with wood preservatives or coatings

4.10.4 The regulator should check all duty of care written descriptions of waste routinely as part of their programmed inspection.

4.11 Bottom ash storage and disposal

4.11.1 All incineration/combustion of solid fuels results in some bottom ash being produced. The operator should control this correctly, to avoid ash escaping off site. This could be something as simple as a well-lidded bin.

4.11.2 The furnace should be designed to minimise the time the operator needs to access the combustion space for de-ashing. For new processes of 1MW thermal input or more, use automatic de-ashing systems. For existing processes, use automatic de-ashing systems where practical.

4.11.3 Store and dispose of bottom ash in a way that prevents the escape of dusty waste (for example in covered containers, purpose-built silos or undercover).

4.12 Record keeping

4.12.1 The operator must keep written records of:

- all inspections, both by external bodies and internal employees
- maintenance, including cleaning, maintenance undertaken by external contractors or internal personnel and breakdowns
- operating procedures with subsequent training records
- emission testing, periodic and operator assessments as well as details of any testing platforms

The regulator will inspect these records, and any relevant duty of care notes, as part of a site visit.

4.12.2 For medium combustion plants, the operator must also keep a written record of:

- the type and quantities of fuels used in the plant
- information proving the effective continuous operation of secondary abatement equipment needed in order to meet the emission limit values
- any malfunctions or breakdown of secondary abatement equipment

4.12.3 The operator must keep records for a minimum of 6 years.

5 Emission limits, monitoring and other provisions

5.1 Emissions monitoring

5.1.1 Emissions of the substances listed in Table 5.1 must, where relevant, be controlled. The emission limit values and provisions described in this section are achievable using the best available techniques described in Section 4.

5.1.2 Operators must monitor emissions using the standard specified in Table 5.1 or paragraph 5.1.3, or an equivalent method agreed by the regulator. Operators must measure all pollutants with a set emission limit value.

Table 5.1 Emission monitoring standards

Substance/parameter	Standard [1]
Carbon monoxide	EN 15058
Dust	EN 13284-1
Oxides of Nitrogen (NO and NO_2, expressed as NO_2)	EN 14792
Total Volatile Organic Compounds	EN 12619
Hydrogen Cyanide	US EPA OTM29
Formaldehyde	A modified version of US EPA Method 316 is the preferred method for measuring formaldehyde, a CEN Technical Specification CEN/TS 17638:2021 is now available and is expected to become a CEN standard in 2023. [2]
Smoke	Ringelmann scale – BS 2742:2009 (Operator assessment)

[1] Standards are periodically amended, updated or replaced so you should check with the Source Testing Association. Further information on monitoring can be found in Environment Agency publications (M1) and (Monitoring Stack Emissions: Environmental Permits).
[2] For practical reasons (for example on very small ducts), it may be acceptable to measure formaldehyde using a method based on BS CEN/TS 13649.

5.1.3 During each measurement, the plant must be operating under stable conditions at a representative even load. In this context, start-up and shut-down periods are excluded.

5.1.4 For new medium combustion plants, the operator must carry out the first measurements within 4 months of the permit being granted or at the start of operation, whichever is the later.

5.1.5 When the regulator determines that continuous measurements are required, the relevant EN standards are EN 15267-1, -2 & -3 and EN 14181, which are applicable to all parameters.

To decide whether more frequent monitoring than that set out in Tables 5.2 to 5.5 or continuous monitoring is required, the regulator should take into account:

- the level of risk to local air quality or other sensitive receptors

- variability in operating conditions, for example waste types and feed rate
- absence of secondary dust abatement or reliance on cyclones

In the case of continuous measurements, the automated measuring systems must be checked by parallel measurements with the relevant reference methods at least once a year and the operator must inform the regulator about the results.

5.1.6 Whether sampling on a continuous or non-continuous basis, take care in the design and location of sampling systems to ensure representative samples for all emissions. This means that:

- sampling points on new plant should be designed to comply with the British or equivalent standards
- the operator should ensure that relevant stacks or ducts are fitted with facilities for sampling that allow compliance with the sampling standards

5.2 Emission limit values

5.2.1 All activities should comply with the emission limits and other provisions in Tables 5.2 to 5.5.

5.2.2 Unless stated otherwise, emission limit values (ELVs) for emissions to air refer to values of concentration, expressed as mass of emitted substance per volume of waste gas under standard conditions (dry gas at a temperature of 273.15 K, a pressure of 101.3 kPa, and an oxygen concentration of 6 vol-%), and expressed in the unit mg/Nm^3.

5.2.3 Unless stated otherwise, the averaging periods associated with the ELVs for emissions to air are defined for periodic monitoring as the average over the sampling period (ie the average of 3 consecutive measurements of at least 30 minutes each).

Table 5.2 Emission limit values for plants with a maximum burn rate of 50kg/hr or more but less 90kg/hr

Substance/ parameter	Emission limit value	Type of plant	Minimum monitoring frequency
Smoke	Ringelmann Shade 1	All plants	Daily when in operation

Table 5.3 Emission limit values for plants with a maximum burn rate of 90kg/hr or more but with a rated thermal input of less than 1MW

Substance/ parameter	Emission limit value (mg/Nm^3)	Type of plant	Minimum monitoring frequency
Carbon Monoxide	375	All plants	Annual extractive
Dust	90	All plants	Annual extractive
Oxides of Nitrogen	600	All plants	Annual extractive
TVOC	30	All plants	Annual extractive
HCN [1]	7.5	All plants	Annual extractive
Formaldehyde [2]	7.5	All plants	Annual extractive
Smoke	Ringelmann Shade 1	All plants	Daily when in operation

[1] Only applicable when melamine faced woods are in the fuel.
[2] Only applicable when plywood, chipboard and fibreboard woods are in the fuel.

Table 5.4 Emission limits values for plants with a rated thermal input of 1MW or more but less 5MW

Substance/ parameter	Emission limit value (mg/Nm^3)	Type of plant	Minimum monitoring frequency
Carbon Monoxide	225	All plants	Annual extractive
Dust	90	Existing plants until 31 December 2029 [1]	Annual extractive
	50	New plants and existing plants from 1 January 2030 [2]	Annual extractive
Oxides of Nitrogen	600	Existing plants	Annual extractive
	500	New plants	Annual extractive
TVOC	30	All plants	Annual extractive
HCN [3]	7.5	All plants	Annual extractive
Formaldehyde [4]	7.5	All plants	Annual extractive
Smoke	Ringelmann Shade 1	All plants	Daily when in operation

[1] Existing plant means a combustion plant put into operator before 20 December 2018.
[2] New plant means a combustion plant put into operation after 19 December 2018.
[3] Only applicable when melamine faced woods are in the fuel.
[4] Only applicable when plywood, chipboard and fibreboard woods are in the fuel.

Table 5.5 Emission limits values for plants with a rated thermal input of 5MW or more but with a maximum burn rate of less than 3T/hr

Substance/ parameter	Emission limit value (mg/Nm^3)	Type of plant	Minimum monitoring frequency
Carbon Monoxide	225	All plants	Annual extractive
Dust	90	Existing plants until 31 December 2024 [1]	Annual extractive
	30	New plants and existing plants form 1 January 2025 [2]	Annual extractive
Oxides of Nitrogen	600	Existing plants	Annual extractive
	300	New Plant	Annual extractive
TVOC	30	All plants	Annual extractive
HCN [3]	7.5	All plants	Annual extractive
Formaldehyde [4]	7.5	All plants	Annual extractive
Smoke	Ringelmann Shade 1	All plants	Daily when in operation

[1] Existing plants means a combustion plant put into operator before 20 December 2018.
[2] New plants means a combustion plant put into operation after 19 December 2018.
[3] Only applicable when melamine faced woods are in the fuel.
[4] Only applicable when plywood, chipboard and fibreboard woods are in the fuel.

5.3 Compliance with emission limit values

5.3.1 The emission limits values given in Tables 5.2 to 5.5 apply during normal operating conditions (excluding start up and shut down but including incinerators or combustion plants operating at part load). Emission limit values should be met from the point when waste wood is first introduced into the process. Emissions must be free of dark smoke at all times when the plant is in operation.

5.3.2 Where an operator makes periodic measurements, plants will comply with the emission limit values in tables 5.2 to 5.5 if the results do not exceed the relevant emission limit value.

5.3.3 Where an operator makes continuous measurements on a medium combustion plant, plants will comply with the emission limit values in tables 5.4 and 5.5 if, for the operating hours within a calendar year, if:

- no validated monthly average value exceeds the relevant emission limit values
- no validated daily average value exceeds 110% of the relevant emission limit values
- 95% of all the validated hourly average values over the year do not exceed 200% of the relevant emission limit values

To work out the validated hourly and daily average values, subtract the 95% confidence interval from the measured valid hourly average values.

The 95% confidence intervals of a single measured result must not exceed the following percentages of the emission limit values:

- Carbon monoxide 10%
- Nitrogen oxides 20%
- Dust 30%

The regulator considers any day with more than 3 invalid hourly average values (for example, due to malfunction or maintenance of the automated measuring system) to be invalidated. If more than 10 days in a year are invalidated, the regulator will require the operator to improve the reliability of the automated measuring system.

5.4 Other than normal operating conditions

5.4.1 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 up and shut downs and having adequate procedures in place for start up, shut down and emergency shut downs.

5.5 Reporting and notifications

5.5.1 Communication between the operator and the regulator is essential for an effectively regulated installation.

5.5.2 Where an operator intends to carry out periodic emissions monitoring, they must notify the regulator in sufficient time, so that they can decide whether to observe the testing.

5.5.3 The operator must submit the results of any periodic emission testing to the regulator within a timescale and format agreed with the regulator.

The operator must report all results of continuous emissions monitoring (including the results of parallel measurements using the relevant reference method) annually, or more frequently if required by the regulator. They must submit them within a timescale and format agreed with the regulator.

5.5.4 Where monitoring does not meet the main procedural requirements of the relevant standard, report deviations as well as an estimation of the error involved.

5.5.5 The operator must restore compliance in the shortest possible time, in the event of any:

- non-compliance with any emission limit value
- malfunctions and breakdown of the plant that leads to abnormal operating conditions
- complaints about odour or smoke

To restore compliance, the operator must:

- notify the regulator within 24 hours of receiving the information to agree the investigation of the issue
- undertake the agreed investigation
- adjust the process or activity to minimise those emissions
- if applicable, re-test to demonstrate compliance as soon as possible
- promptly record the events and actions taken
- submit to the regulator the report and updates as agreed

5.5.6 If there are any proposed changes to the plant that could affect the emission limit values, the operator must inform the regulator, as soon as they are aware of the changes. This will allow the regulator time to make any assessments necessary to change the permit.