

Some Basic Questions & Answers Now that the Medium Combustion Plant Directive (MCPD) is being enforced

The Medium Combustion Plant Directive (MCPD) sets out rules to control emissions of sulphur dioxide (SO₂), nitrogen oxides (NO_x) and dust into the air. The Directive applies to the operation of all Medium Combustion Plant (MCP) including Specified Generators (SGs).

An MCP is any plant or equipment used to burn (combust) materials, with a rated thermal input between 1 and 50 MWth. This includes burning some biomass waste, as all other wastes are covered by the waste incineration Directive.

Specified Generators are any Medium Combustion Plant used to generate electricity, on a site where the total (aggregated) megawatt thermal input is less than 50 MWth. They are divided into Tranche A and Tranche B categories, depending on their operational start date or the type of electricity supply contract. SGs also fall under the Specified Generator Regulations (SGRs) which likewise controls emission to air, primarily NO_x, from generators that would not be captured by the MCPD.

Who are the regulators for MCPD?

The Competent Authorities dealing with the MCPD:

- Environment Agency (EA)
- Scottish Environment Protection Agency (SEPA)
- Northern Ireland Environment Agency (NIEA)
- Natural Resources Wales (NRW)

What is SO₂, CO, NO_x, O₂?

Sulphur Dioxide (SO₂) is a gas. It is invisible and has a nasty, sharp smell. It reacts easily with other substances to form harmful compounds, such as sulphuric acid, sulphurous acid and sulphate particles. About 99% of the sulphur dioxide in air comes from human sources.

Carbon monoxide (CO) is a colourless, odourless, and tasteless gas that is slightly less dense than air. In the atmosphere, it is spatially variable and short lived, having a role in the formation of ground-level ozone.

NO_x is a generic term for the **nitrogen oxides** that are most relevant for air pollution, namely nitric oxide (NO) and nitrogen dioxide (NO₂). These gases contribute to the formation of smog and acid rain, as well as affecting tropospheric ozone.

NO_x gases are usually produced from the reaction among nitrogen and oxygen during combustion of fuels, such as hydrocarbons, in air; especially at high temperatures, such as occur in car engines. In areas of high motor vehicle traffic, such as in large cities, the nitrogen oxides emitted can be a significant source of air pollution.

Oxygen (O₂) is a chemical element. It is a member of the chalcogen group on the periodic table, a highly reactive non-metal, and an oxidizing agent that readily forms oxides with most elements as well as with other compounds. By mass, oxygen is the third-most abundant element in the universe, after hydrogen and helium.

Emission Limit Values

Emissions are defined as flow, particulates and gas concentrations of stack gas emissions.

The values are the measurement of emissions to atmosphere.

The Emission Limit Values (ELVs) have been brought in as a standard measurement for MCPs to limit the emissions, in an attempt to reduce pollution of the atmosphere.

By using defined values it ensures that the Competent Authorities dealing with the MCPD will receive results at a standardised value.

The Directive states:

“All emission limit values are defined at a temperature of 273,15 K, a pressure of 101,3 kPa and after correction for the water vapour content of the waste gases and at a standardised O₂ content of 6 % for Medium Combustion Plants using solid fuels, 3 % for Medium Combustion Plants, other than engines and gas turbines, using liquid and gaseous fuels and 15 % for engines and gas turbines.”

“Monitoring results shall be corrected to the required reference conditions and reported to the competent authority, without subtraction of the measurement uncertainty. After monitoring results have been reported, the measurement uncertainty will be considered by the competent authority, when assessing compliance with an emission limit.”

There are multiple calculations available to convert your result to meet the standardised temperature, pressure, water vapour content and oxygen levels defined.

For assistance with the calculations please see M2 Pages 8 & 9:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/635235/LIT_6405.pdf

Measuring Emissions

The requirement for measuring gas concentrations are much simpler than those for measuring flow and particulates. Provided the gases are well mixed, the approach to sampling is more straightforward because single point sampling may be carried out rather than multipoint grid sampling. These simpler arrangements will exist for most measurements carried out to meet the requirements of the MCPD and SGRs.

Where gas sampling only is required, it is acceptable to sample from a location close to the MCP or SG, where the gases are well mixed (for example a downstream location that is close to the combustion zone is assumed to be well mixed).

There are two proposed testing regimes;

1. random testing which would require the end user to arrange testing and retain records which are made available to the authorities on request or;
2. scheduled testing where the testing is performed either in front of the Regulator or reports are passed to the Regulator at specified times.

What is the difference between a new MCP and an Existing Plant?

A new MCP is a combustion unit that was first fired on or after 20 Dec 2018. Anything used before that is called existing plant.

In the Directive Gas and gas oil only have NO_x limits but CO must also be measured and reported.

New Plant NO_x Limits

New plant MCP NO_x limits are 100 mg/m³ on gas and 200 mg/m³ on gas oil for all plants individually 1-50MWth net rated thermal input. If you have more than one new plant the emissions can be aggregated, but as the limits are the same for all sizes this is immaterial. It only affects measurement and reporting which is done on an annual basis for 20 MWth and above and every 3 years for plant less than 20 MWth.

Existing Plant Registration

Existing plants 5-50MWth input must be registered with your Competent Authority by 01/01/2024 and the NO_x limits from 01/01/25 are 200 mg/m³ on gas and 200 mg/m³ on gas oil.

Existing plants 1-5 MWth input must be registered with your Competent Authority by 01/01/2029 and the NO_x limits from 01/01/2030 are 250 mg/m³ on gas and 200 mg/m³ on gas oil.

When does an existing plant become a new plant?

The Directive states:

Article 9 Changes to Medium Combustion Plants.

Member States shall take the necessary measures to ensure that the operator informs the Competent Authority, without undue delay, of any planned change to the Medium Combustion Plant which would affect the applicable Emission Limit Values.

So, the '**letter of the law**' is that you only need to declare a planned change if the Emission Limit Values (ELVs) change, and the ELVs can only change if you change (or add to) the fuels burned. This may catch people moving from HFO to gas for example - the pragmatic view is that they should change to protect the environment and not be penalised, but the Directive implies they must register the plant when the change takes place.

The EA guidance note states:

When does existing become new:

Any existing MCP that is altered or repaired such that the ELVs for that MCP will change shall be considered new (see Art 9) i.e. if an existing boiler is running on heavy oil and it is converted to run on natural gas this will be a new MCP. An existing MCP can become a new MCP if it is Substantially Refurbished. A Substantial Refurbishment is one whose costs exceed 50% of the investment cost for a new comparable MCP unit. Ref: Energy Efficiency Directive Art.14.

So, they have taken the Directive rule and added a 50% cost rule as well. This implies that it is not a change of fuel alone that drives the 'existing/new' decision but also a replacement cost rule applicable to the whole MCP. Therefore, if you have an old 3MWth input gas fired boiler and you replace the burner, the control panel and other parts such that the cost of replacement parts is >50% of the cost of a new plant you now have a new MCP, but running on the same fuel. I think this scenario is unlikely, unless you buy a whole new boiler.

Best advice from CEA is:

"change the fuel and you are 'new'; change anything else and you are 'existing'. Buy a new boiler and it is 'new'."

Biomass

Biomass is defined by products consisting of any vegetable matter from agriculture or forestry which can be used as a fuel for the purpose of recovering its energy content.

The Directive states:

(11) Medium Combustion Plants that are already subject to Union-wide minimum requirements, such as plants to which an aggregation rule applies under Chapter III of Directive 2010/75/EU, or plants that incinerate or co-incinerate solid or liquid waste and are thereby covered by Chapter IV of that Directive, should be excluded from the scope of this Directive (MCPD).

How are the rules being implemented?

The rules are being implemented in a slightly different way in each UK country. Take care to check with the local regulator (EA, SEPA, NIEA, NRW) although some of the information is sparse and difficult to find.

The big issue many will face is Article 6 (9) of the Directive:

9. In zones or parts of zones not complying with the air quality limit values laid down in Directive 2008/50/EC, Member States shall assess the need to apply, for individual Medium Combustion Plants in those zones or parts of zones, stricter Emission Limit Values than those set out in this Directive, as part of the development of air quality plans referred to in Article 23 of Directive 2008/50/EC, taking into account the results of the information exchange referred to in paragraph 10 of this Article, provided that applying such Emission Limit Values would effectively contribute to a noticeable improvement of air quality.

This means that Local Authorities might set tighter limits, especially in Air Quality Management Zones, and the only way to find out is to ask the question for which you may not like the answer. In London for example 40mg/kWh is already in their local rules.

Permits

There are two types of Permit and you will need to consider which one you require.

Standard Rules Permit (SRP) or a Bespoke Permit are the two choices and your Competent Authority may have to advise you which one you need.

The suite of SRPs available are:

- SR2018 No 1: Specified Generator, Tranche B low risk, base load operation between 0 – 5 MWth
- SR2018 No 2: Specified Generator, Tranche B low risk, base load operation 0 – 2 MWth with high background NOx
- SR2018 No 3: Specified Generator, Tranche B low risk, base load operation 0 – 2 MWth in Air Quality Management Areas or high ambient NOx
- SR2018 No 4: Specified Generator, Tranche B low risk, 0 – 20 MWth of gas or abated diesel engines operated less than 500 hours a year
- SR2018 No 5: Specified Generator, Tranche B low risk, 0 – 20 MWth of gas or abated diesel engines operated less than 1,500 hours a year
- SR2018 No 6: Specified Generator, Tranche B low risk, base load operation 0 – 1.3 MWth with high background NOx
- SR2018 No 7: New, low risk, stationary Medium Combustion Plant 1 < 20MWth (in operation after 20/12/2018)
- SR2018 No 8: mobile plant Specified Generator, Tranche B low risk, base load operation

Within these rules are conditions of application. An example of conditions include the Fuel & technology of the MCP, each fuel and technology has a Minimum release height (chimney height) and a Minimum distance from and MCP to a Natura 2000 site (SAC or SPA).

If an operator is unable to meet the SRP conditions they will need to apply for a bespoke permit.

The EA have developed a tool (SG Screening tool) that allows an operator to differentiate between a simple and a complex bespoke permit.

A plant is considered “low risk”:

- burning standard fuels complying with a recognised standard such as natural gas, LPG, or light oils to BS 2869

A plant is considered high risk when:

- burning non-standard fuels
- it falls within an Air Quality Management Area

To find out if you're in an AQMA (and a high proportion of plant will be), you can use the interactive map here: <https://uk-air.defra.gov.uk/aqma/maps>

Plant falling within an AQMA may well have stricter ELV's imposed.

To find out your distance from a Natura 2000 Site: <http://natura2000.eea.europa.eu/>

How to comply

Operators must:

- Hold a permit for an operational plant by the relevant deadline
- Comply with their permit conditions
- Monitor emissions to demonstrate compliance with the ELVs in their permit and at the prescribed frequency
- Keep records of the operation of their plant for at least six years to demonstrate compliance
- Pay an annual subsistence charge

It is likely that subsistence charge bills will not be issued until the start of the next financial year – April 2019. Subsistence charges will then be backdated to the effective date of the permit, for example 20th December 2018 or 1st January 2019.

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