D1c Pig iron production; Blast furnaces

These regulations were cancelled in September 2004, following the inclusion of the BREFs in the NeR.

D1d Production of oxygen blown steel

These regulations were cancelled in September 2004, following the inclusion of the BREFs in the NeR.

D2 Production of primary aluminium

These regulations were cancelled in September 2004, following the inclusion of the BREFs in the NeR.

D3 Iron and steel foundries and smelting plants

These regulations were included in the NeR in May 1992. Unless specific requirements for emissions are explicitly mentioned in the following, the general provisions of the NeR will apply.

Foundries

Particulates

The general standards of the NeR apply to particulate emissions.

Amines

The waste gases which are produced in core fabrication, core-sand mixing, recycling, drying and hardening must be collected as much as possible or be exhausted at the source, and then submitted to treatment by cleaning equipment.

The emission concentration of amines may not exceed 5.0 mg/m_o^3.

Smelting furnaces

Dioxins

Feedstocks for the smelting furnaces must contain the least possible content in chlorine compounds in order to prevent the formation of dioxins.

Particulates

New smelting furnaces and newly installed dust separation devices must comply with the general standards for particulates.*

* The feasibility of this standard is still the subject of consultations and research.

E1 Coking plants

These regulations were cancelled in September 2004, following the inclusion of the BREFs in the NeR.

E2 Production of chlorine

These regulations were cancelled in September 2004, following the inclusion of the BREFs in the NeR.

E3 PVC-production, suspension polymerisation

These regulations were included in the NeR in May 1992. Unless specific requirements for emissions are explicitly mentioned in the following, the general provisions of the NeR will apply.

Vinyl chloride

The emission of vinyl chloride must be kept as low as possible.

Before the reactor may be opened it must be flushed at least twice (for example with nitrogen), and the flushing gases must be redirected to a suitable recovery plant for vinyl chloride.

The gases and vapours from the water stripper must be discharged to a recovery plant or to a boiler or a dedicated incineration device.

In the case of a mass flow per source below the limit mass flow of 25g/h a daily average emission concentration level of 30 mg/m_o^3 applies if an active carbon filter is used.

Where incineration is practised, the general standard applies.

The PVC powder, on leaving the afterdrier, may not contain vinyl chloride levels in excess of 2.0 mg/kg.

The emission of vinyl chloride from the siphon shaped water locks of the gas holders should be kept to minimum possible levels.

> As per July 2000 there are legal requirements in place for the production of PVC using the suspension polymerisation process (*Staatscourant* 2000, no. 136).

E4 Production of acrylonitrile

These regulations were included in the NeR in May 1992. Unless specific requirements for emissions are explicitly mentioned in the following, the general provisions of the NeR will apply

Acrylonitrile
The waste gases from the reactor and absorber must be fed into an incinerator.
The emission concentration of acrylonitrile in the waste gas from the incinerator may not exceed 0.5 mg/m_o^3. This is the detection limit indicated for very good analysis techniques.
The emissions released in the distillation of the reaction products and the emissions released due to displacement losses in the case of storage of (intermediate) products must comply with the general requirements of the NeR.

E5 Manufacture of plastics containing acrylonitrile

These regulations were included in the NeR in May 1992. Unless specific requirements for emissions are explicitly mentioned in the following, the general provisions of the NeR will apply.

Acrylonitrile
All waste gas flows with a concentration of acrylonitrile of more than 5.0 mg/m_o^3 must be fed into a waste gas treatment plant.

If concentrated waste gas flows from the polymerisation process are fed into a special incinerator a requirement applies of 0.5 mg/m_o^3 acrylonitrile, or a combustion efficiency of at least 99%.

For the removal of acrylonitrile from waste gases in highly dilute flows, such as the waste gases from the dryers, preference should be given to techniques other than incineration.
If incinerators are utilised the general requirements of the NeR apply, and a combustion efficiency of at least 97.5% is required.

E6 Claus plants (used in sulphur production and as a flue gas treatment system)

These regulations were included in the NeR in May 1992. Unless specific requirements for emissions are explicitly mentioned in the following, the general provisions of the NeR will apply.

Oxides of sulphur
New installations
a. New installations for the production of sulphur using the Claus process, or modifications thereof, must have been designed for a conversion efficiency of 99.8%. They must be operated in line with design criteria as far as possible.
b. If the original rated H_2S processing capacity of the total facility is increased by more than 50%, then the total amount of H_2S fed into the installation (including existing installations) must be processed with a conversion efficiency of 99.8%. If the total of multiple subsequent extensions exceeds 50% of the original rated capacity, the above criteria also apply.

Existing Installations
The total emissions from existing installations in a facility must have been reduced by at least 75% before 1 January 1996. This stipulation only applies where an average conversion efficiency of 99% for the total processing of H_2S in the facility is not obtained.

Small plants
For installations with a sulphur production output of less than 5.0 tonnes per day the rule applies that the emission of sulphur compounds is allowed to amount to a maximum of 2% of the production output.

Hydrogen sulphide
For all installations the standard applies that the emission concentration of hydrogen sulphide may not exceed 10 mg/m_o^3.

For new and existing installations a commitment is required to comply in due time with the general requirements of the NeR.

E7 Production of nitrogen-based fertiliser

These regulations were included in the NeR in May 1992. Unless specific requirements for emissions are explicitly mentioned in the following, the general provisions of the NeR will apply.

Ammonia
The concentrations of gaseous ammonia released in the production of nitrate-containing fertilisers in the case of new installations may not exceed 30 mg/m_o^3. This requirement does not apply to the waste gases from urea granulation.

For existing installations the status quo must be maintained, that is to say that, depending on the present emission level, a requirement of between 30 and 200 mg/m_o^3 continues to apply.

Particulates
Particulate emissions from granulators and prilling towers are in principle subject to the general particulate standard, except that the fineness and hygroscopic nature of ammonium nitrate and urea mists limit the optimum separation yield of filtering separators, which may impose the need to depart from the general concentration standards on duly stated grounds.

E8 Ammonia plants

These regulations were included in the NeR in May 1992. Unless specific requirements for emissions are explicitly mentioned in the following, the general provisions of the NeR will apply.

Ammonia
The concentrations of ammonia in the waste gases of point sources in ammonia plants may not exceed 30 mg/m_o^3.

E9 Installations for the production, formulation or packaging of pesticides

These regulations were included in the NeR in May 1992. Unless specific requirements for emissions are explicitly mentioned in the following, the general provisions of the NeR will apply.

Particulates
In the waste gases of installations for the production of 'active substances' as referred to in the Pesticides Act (*Bestrijdingsmiddelenwet*), the particulate content, including the active components, in the case of a mass flow of 25 g/hour and more may not exceed a concentration of 5.0 mg/m_o^3.
In installations for the packaging and formulation of pesticides, extracted air containing particulates must be subjected to cleaning in a dust removal plant; the concentration of particulate emissions may not exceed 5.0 mg/m_o^3.

E10 Production of silicon carbide

These regulations were included in the NeR in May 1992. Unless specific requirements for emissions are explicitly mentioned in the following, the general provisions of the NeR will apply.

Oxides of sulphur
The production facilities must be provided with covers in such a way that the fumes produced during the production of silicon carbide are collected and fed into an incinerator after first having been passed through a de-sulphurisation plant. The aim should be to achieve the lowest possible sulphur content in the petroleum coke used.

Particulates
During the assembly and disassembly of the production facilities they must be sprayed with water in order to prevent the emission of particulates.

NH_3, H_2S, odours
Drainage water containing ammonia and hydrogen sulphide must be collected and purified in a water treatment plant.

E11 Installations for natural gas and petroleum extraction

These regulations were included in the NeR in January 1996. Unless specific requirements for emissions are explicitly mentioned in the following, the general provisions of the NeR will apply.

These special regulations target extraction facilities for natural gas and petroleum and the associated processes for treating them. Installations exclusively intended for de-sulphurisation of (acid) gas containing a high percentage of hydrogen sulphide are not subject to the provisions of these regulations because the process used is very different. Refer, for instance, to E6 for more details.

Definition of the term 'installations'
The regulation applies to installations as referred to in Article 8.2, paragraph 3 of the Environmental Protection Act (*Wet Milieubeheer*) , (Article 9 paragraph 1, item 4 of the Mining Act (*Mijnwet*) of 4 February 1994; *Staatsblad* 135) as well as equivalent installations covered by the Mining Act for Operations on the Continental Shelf (*Mijnwet Continentaal Plat*), dated 4 February 1994, Staatsblad 135).

The following provisions apply in the case of new installations. Existing installations must have a comparable level of abatement facilities in place before 1 January 2000 (taking into account the cost effectiveness of the adaptations required) unless the installations involved cease to be operational after 1 January 2005. Especially in the case of off-shore installations, the restrictions that apply in the interest of safety, weight and available space must be taken into account when emission abatement facilities are being prescribed.
Installations incorporating flares are not customary in the case of gas extraction platforms at sea: these are usually replaced by venting systems.
Furthermore, emission reductions achieved by punctual scheduled maintenance can be a problem, especially in the case of unmanned installations due to the lower frequency of inspections. That is why in these cases low emission or maintenance free systems must be preferred.

New and existing installations
For the definitions of new and existing installations please refer to the descriptions given in the Declaration of intent entitled '*Uitvoering milieubeleid olie en gaswinningsindustrie*' (Implementation of environmental policies in the oil and gas extraction industries).

Volatile organic substances

Definition of VOC
Volatile organic substances in this context also includes methane. In determining the level of abatement facilities required in the present regulations the presence of benzene in natural gas has been taken into consideration.

Off-shore installations (gas and oil)
Newly erected extraction facilities must be equipped with an efficient system to control the key emissions of volatile components from the condensate.
The preferred measure is to transport the condensate off the facility under pressure, allowing the (provisional) de-gassing and final stabilising to be carried out as much as possible at a central location, the waste gases of which can subsequently be required to be treated as in the case of land-based installations. Depending on the situation, such measures will need to be implemented in phases. Furthermore, vented gases must be used wherever possible as a fuel for engines, turbines or furnaces.

Land-based installations (gas and oil)
The destruction efficiencies of flares indicated below must be interpreted as rated efficiencies that apply under standard conditions. The use of purging gases must be limited as much as possible by employing adequate technical measures. Purging with inert gas is usually incompatible with the minimum combustion efficiencies required. Injection with steam as a technical measure is not yet considered as Best Available Technique within the context of the installations affected by the present regulations.
The measures to be taken are dependent on the nature and the process conditions (in particular the pressures) of the waste gases being released. The following sources and conditions are recognised:

Waste gas flows of medium pressure (> 300 kPa)
Waste gas flows of medium pressure released during normal operation must, where this can be done effectively, be re-compressed and injected into the main stream of the gas being produced or, alternatively, be utilised as a fuel. If it is not economically feasible to utilise them, the waste gas flows concerned must be discharged via a medium pressure (safety) flare. This flare must be designed to have an efficiency of 99% minimum.
It concerns the following sources:
- stabilisation of condensate (first step);
- glycol flash gas.

Low pressure waste gas flows (< 300 kPa)
Continuously and semi-continuously released waste gas flows must be put to practical use wherever possible, or, if this is not possible, be discharged to a (separate low-pressure) flare which is designed with a view to burn the waste gases with a minimum efficiency of 99%.
This applies in particular to the following sources:
- non-condensable vapours from the glycol regeneration process;
- storage tanks for condensates, breathing losses;
- blanketing gas used in storage tanks (condensate etc.);
- stabilisation of condensates (LP);

Insofar as they are isolated from the environment and can be treated as point sources:
- waste gases emitted from cartridge-type seals in compressors and gases vented from the crankcases of compressors;
- emissions resulting from the loading and unloading of condensates.

Flares
An alternative for burning the waste gases in a separate flare is to feed them to the burners of the glycol regeneration furnace, provided that optimal combustion is permanently guaranteed and the adjustment range of the furnace allows this option. Provided that a high destruction efficiency can be guaranteed, these low pressure flows may also be burnt in the (medium pressure) safety flare mentioned earlier.

Waste gases from sources of organic substances not specifically mentioned here with an estimated average waste gas flow in excess of 5 to 20 m^3/h must also be treated in the manner described above. Low pressure waste gas flows containing hydrocarbons – including the above-mentioned flows – with a smaller mass flow, can be exempted from measures being taken. These include:

- breathers of water tanks.

The use of natural gas as a priming gas for turbines and gas engines results in short-lasting, very high emissions. Feeding such flows to a flare creates problems because the existing flare capacity cannot cope with them. Methods must be devised in order to eliminate the use of natural gas as a priming gas or, alternatively, to reduce it.

Fugitive emissions

The selection of certain types of valves, flanges and other fittings must be done with minimum leakage in mind. In order to control fugitive emissions a schedule must be drawn up arranging high profile inspection and maintenance of pumps, compressors, valves, safety valves and other fittings. As a part of these arrangements the leakage from the types of fittings mentioned above in particular must be measured at least once a year. Flanges, vents, drains (provided that they are fitted with a plug) and sampling points need not be measured every year. Any leakages that are noticed must be remedied immediately. Leakages in this context mean emission concentrations in excess of 10,000 ppm by volume of all hydrocarbons taken together and/or in excess of 500 ppm by volume in the case of benzene. If repairs are not possible while the installation is in operation they must be carried out at the latest the next time the installation is stopped for maintenance.

Incidental emissions resulting from starting up, shutting down and emergency stop procedures

The general requirements are not applicable to situations that occur on an incidental basis.
Incidentally released gas flows must be discharged to an appropriate emergency facility.
Activities of an incidental nature include:

- start-up of the gas purification process;
- testing of the emergency facilities for venting gas;
- emergency stops;
- in the case of planned stops, depressurising (part of) the equipment;
- maintenance to wells.

In assessing whether it is necessary or desirable from an environmental protection point of view to opt for a flare as safety system, the continuous emission of flare-based installations will need to be weighed against the uncontrolled emissions which can occur during incidental process conditions. On the basis of a safety and environment targeted evaluation for the individual location the considerations of §2.4.5 may be overruled.

Well drilling activities

Wherever possible the gases which are released during the testing of a new well must be collected and put to some practical use. If this is not possible, the waste gases must be burnt with the aid of a (temporary) flare. The gases which are released during the final (post-) production stages of a well must be burnt using a flare wherever possible.

NO_x

On- and off-shore

For furnaces, gas engines and gas turbines for which explicit rules are given in the Decree on emission standards for combustion plants (Besluit emissie-eisen stookinstallaties, BEES) but which are officially not covered by the Decree, emission requirements may be drawn up which are based on the Decree. In laying down the standards to be met the non-standard composition of certain flows that may be present in the mix being burnt must be taken into consideration.

Requirements as compared to BEES

Due to the comparability of the processes and the options for reducing emissions that are available the same requirements can be made applicable as in BEES. Prompted by the amendment of BEES A and BEES B in 1998, the necessity of adjusting the present regulation will be duly considered.

Furnaces

The emissions from gas fired furnaces for regenerating glycol may not exceed 150 mg/m_o^3 NO_x in the case of new and existing installations.
The emission values quoted are based on a (reference) oxygen content of 3%.

The waste gases employed generally deviate in terms of their caloric value from standard natural gas. The correction factor for the emission concentration to be used because of this is the ratio between the lowest encountered caloric value of the used gas (in MJ/kg) and the caloric value of natural gas, which has been standardised at 38 MJ/kg.

Gas engines

The emissions from gas engines may not exceed:

- 270 g NO_x per GJ in the case of existing engines;
- 140 g NO_x per GJ in the case of new engines.

In both cases the values must be multiplied by 1/30 of the engine efficiency.

NO_x requirement for existing gas engines

The feasibility of this standard is still the subject of consultations and research. The potential technologies being considered are either adapting the air to fuel ratio in combination with engine management systems in the case of lean burning engines or the use of exhaust fitted catalytic converters in the case of rich mixture engines.

Gas turbines
The emissions from gas turbines may not exceed:
- 200 g NO_x per GJ in the case of existing turbines;
- 200 g NO_x per GJ in the case of new turbines;

In both cases the values must be multiplied by a factor of 1/30 of the turbine efficiency.

The waste gases employed generally deviate in terms of their caloric value from standard natural gas. The correction factor for the emission concentration to be used because of this is the ratio between the lowest encountered caloric value of the used gas (in MJ/kg) and the caloric value of natural gas, which has been standardised at 38 MJ/kg. This factor may not be greater than 1.1 and not smaller than 0.9.

NO_x requirement for new gas turbines
In the case of new turbines lower emission requirements – even as low as 65 g/GJ – may be made compulsory due to the levels guaranteed for modern gas turbines employing dry-low NO_x technologies. For these installations, steam injection is not considered Best Available Technique.

SO_2, H_2S
In the case of fields producing natural gas with a relatively high concentration of hydrogen sulphide and other compounds, demands must be formulated for SO_2 and H_2S on the basis of further testing under actual conditions.

Mandatory inspections
The above-mentioned sources must be monitored in accordance with the provisions of §3.7. This having been said, additionally the rule applies that taking measurements may be decided against if on the basis of properties typical for the equipment, or, alternatively, based on certified measurements, it is possible to reliably determine the emissions that will occur under normal operating conditions.

Fugitive emissions
Pumps, compressors and safety equipment and valves must be inspected annually in accordance with EPA method 21. The requirement of semi-annual testing of all valves for leakage may be relaxed to comprise an annual random sample of 25% of those valves if, on the basis of measurements, it can be demonstrated that less than 5% of all valves leak an emission concentration of 10,000 ppm per volume of all hydrocarbons taken together or, where applicable, less than 15% of all valves leak an emission concentration of 500 ppm per volume of benzene.

Furnaces, gas engines, turbines
For the methods of taking measurements, the frequency of inspections and the interpretation of measurement results, as well as for the manner in which these results must be reported, please refer to the sections concerned in BEES A and B.

F1 Installations for the thermal reclamation of metals from cables and corresponding utilities

These regulations were included in the NeR in May 1992. Unless specific requirements for emissions are explicitly mentioned in the following, the general provisions of the NeR will apply.

In cases where the installations concerned are beyond the scope of the Decree on air emissions from waste incineration (Besluit luchtemissies afvalverbranding, BLA[1]), nevertheless the emission requirements laid down in that document are applicable, except that:

- the emission standards are based on an oxygen content of 6% by volume;
- the incinerators must be equipped with an efficient afterburner;
- the temperature maintained in the afterburning area must be at least 800°C and this temperature must be maintained until the end of the operating period;.
- the temperature maintained in the afterburner must be at least 1200°C if the items to be processed contain 10 mg/kg or more of halogenated aromatic hydrocarbons;
- independently of the combustion temperatures indicated above, the fumes must remain in the afterburning area for a sufficiently long time (at least 2 s) and a minimum oxygen availability of 6% must be maintained;
- the metal-recovery process may only be started if the required incineration temperature has been reached;
- residues may not continue to give off fumes after leaving the installation;
- the installations must be equipped with measurement devices which continuously monitor the mass concentrations of particulates and carbon monoxide in the waste gases, and the afterburning temperature; installations in which chlorinated components are incinerated must be equipped with measurement devices which continuously record the concentration by mass of gaseous inorganic chlorine compounds.

1 For the emission standards of the Decree on air emissions from waste incineration (Besluit luchtemissies afvalverbranding, BLA) refer to the explanatory note in Special Regulation A1.