ENVIRONMENTAL PROTECTION AGENCY

BATNEEC GUIDANCE NOTE

Class 3.2 & 3.8

FORGES, DRAWING PLANTS AND ROLLING MILLS

AND FOR

PRESSING, DRAWING AND STAMPING OF LARGE CASTINGS

(DRAFT 3)

1. INTRODUCTION

This Guidance Note is one of a series issued by the Environmental Protection Agency and is designed to provide guidance to those applying for integrated pollution control licences under the EPA Act. It should also be read in conjunction with *Application Guidance Notes*, available under separate cover.

It should be noted at the outset, that noise is not included within the scope of this work and guidance on this parameter has been issued separately.

This Guidance Note is comprised of seven main sections and an appendix. Following this introduction, Section 2 contains a general note on the interpretation of BATNEEC. The industrial activity covered by the terms of this note is given in Section 3. In Section 4, the technologies to control emissions are tabulated and in Section 5 the specific emission limit values (ELVs) are given. Section 6 contains comments on compliance monitoring requirements, while the principal references are given in Section 7.

The Appendix gives the main sources of emissions, and the principal releases from such sources.

All applicants for Integrated Pollution Control licences, in the sector covered by this note, should carefully examine the information laid down in this Guidance Note, and should use this information to assist in the making of a satisfactory application for an Integrated Pollution Control licence to the Agency. It should be clearly understood that achieving the emission limit values does not, by itself, meet the overall requirements in relation to IPC. In addition to meeting such values the applicant will also be required to demonstrate that waste minimisation is a priority objective and to put in place particular abatement measures to reduce overall mass emissions and pollutant load where this is necessary to protect the ambient environment.

The technologies and the associated emission limit values (ELVs) identified in this Guidance Note are, at the time of writing, regarded as representing BATNEEC for new activities. BATNEEC is not a static quality and will change as technologies, environmental factors and costs alter with the passage of time. The Agency may amend or update the guidance contained in this note should such amendments seem appropriate. The information contained in this Guidance Note is intended to be used only as a tool to assist in determining the BATNEEC for an operation in this sector and should not be taken to be a definitive authority on the BATNEEC for this sector**.** This Note should not be considered as a legal document**.**

2. INTERPRETATION OF BATNEEC

BATNEEC means '*the best available technology not entailing excessive costs'*. The technology in question should be **Best** at preventing pollution and **Available** in the sense that it is procurable by the industry concerned. **Technology** itself is taken as the techniques and the use of the techniques, including training and maintenance etc. **NEEC** addresses the balance between environmental benefit and financial expense.

The objective of the Best Available Technology Not Entailing Excessive Costs (BATNEEC) Guidelines is to provide a list of technologies which will be used by the EPA to determine BATNEEC for a scheduled activity. The BATNEEC identified in this Guidance Note is used as a basis for setting emission limit values. It is intended to update these guidelines as required in order to incorporate technological advances as they occur.

In the identification of BATNEEC, emphasis is placed on pollution prevention techniques, including cleaner technologies and waste minimisation, rather than end-of-pipe treatment.

Technologies identified in the BATNEEC guidelines are considered to be current best practice for the purposes of setting emission limit values. These technologies are representative of a wide range of currently employed technologies appropriate to particular circumstances. However, the guidance issued in this note in respect of the use of any technology, technique or standard does not preclude the use of any other similar technology, technique or standard which may achieve the same emission. The entire range would not necessarily be appropriate in specific cases. The specific choice depends on a wide range of circumstances but the crucial factor is that the selected regime achieves BATNEEC. In applying BATNEEC, Environmental Quality Objectives (EQOs) must be respected where set. Measures such as in-plant changes, raw material substitution, process recycling and improved material handling and storage practices, may also be employed to effect reductions in emissions. As well as providing for the installation of equipment and the operation of procedures for the reduction of possible emissions, BATNEEC will also necessitate the adoption of an on-going programme of environmental management and control, which will focus on continuing improvements aimed at prevention, elimination and/or progressive reduction of emissions.

As described in the EPA Act of 1992, BATNEEC will be used to prevent, eliminate or, where that is not practicable, limit, abate, or reduce an emission from an activity which is listed in the first schedule to the Act. The use of BATNEEC is construed in the Act to mean the provision and proper maintenance, operation, use and supervision of facilities which are the most suitable for the purposes.

In determining BATNEEC for an activity, regard shall be had to :

- the current state of technical knowledge;

- the requirements of environmental protection;

- the application of measures for these purposes, which do not entail excessive costs, having regard to the risk of significant environmental pollution which, in the opinion of the agency, exists.

For existing facilities, additional regard shall be had to :

- the nature, extent and effect of the emission concerned;

- the nature and age of the existing facilities connected with the activity and the period during which the facilities are likely to be used or to continue in operation, and

- the costs which would be incurred in improving or replacing these existing facilities in relation to the economic situation of activities of the class concerned.

The technologies and the associated emission limit values (ELVs) identified in this Guidance Note are regarded as representing BATNEEC for a *new* activity. However, it is also generally envisaged that *existing* facilities will progress towards attainment of similar emission limit values, but the specific ELV requirements and associated time frames will be identified on a case by case basis when the licence application is being processed. Furthermore, for *all* facilities, additional and more stringent requirements may be specified on a site-specific basis whenever environmental protection so requires. Hence the BATNEEC guidelines are not the sole basis on which licence emission limit values are to be set, since information from other sources will also be considered, including site-specific environmental and technical data, plant financial data and other relevant information.

3. SECTOR COVERED BY THIS GUIDANCE NOTE

This Guidance Note covers SECTORS 3.2 and 3.8 of the activities specified in the First Schedule to the EPA Act 1992. These are:

3.2 The processing of iron and steel in forges, drawing plants and rolling mills where the production area exceeds 500 square metres.

3.8. The pressing, drawing and stamping of large castings where the production area exceeds 500 square metres.

Note: Noise aspects are subject to separate guidance.

4. CONTROL TECHNOLOGIES

4.1 INTRODUCTION

As explained in Section 2, this Guidance Note identifies BATNEEC for a new activity, but obviously does so in the absence of site-specific information. Accordingly it represents the minimum requirements expected of any new activity covered by the Note, but does not exclude additional requirements which may form part of the granting of a licence for a specific site.

The approach to be used in selecting BATNEEC is based on the following hierarchy:

- Process design / redesign changes to **eliminate** emissions and wastes that might pose environmental problems.
- **Substitution** of materials (e.g. non-nitrate acids) by environmentally less harmful ones.
- Demonstration of waste **minimisation** by means of process control, inventory control and end-of-pipe technologies etc.

The existing or possible measures for reducing and controlling emissions are described in this section. These range from relatively simple containment measures to sophisticated recovery and "end-of-pipe" technologies and include:

(i) Load Minimisation
(ii) Containment
(iii) Recovery/recycle
(iv) Emission reduction
(v) Waste treatment & disposal

The measures listed below are all in place in existing plants in Europe. At the very least, therefore, the technical feasibility of the measures has been demonstrated. These, used singly or in combination, represent BATNEEC solutions when implemented in the appropriate circumstances. The circumstances depend on plant scale, materials used, nature of the products made etc. A summary of the treatments for various emissions is given at the end of the section.

Note that where flammable/explosive vapours or dusts are handled, safety procedures (acceptable to HSA) should be adopted and nothing in this note should be construed as advice to the contrary.

4.2 TECHNOLOGIES FOR LOAD MINIMISATION

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and environmental site constraints).

- Bunding of all stored materials with separate bunding for incompatibles.
- Inventory control.
- Optimisation of water recirculation and reuse.
- Dry equipment cleaning and dry vacuum systems, where feasible.
- Separation of cooling water, storm water and abatement/recovery process effluents different origin in order to permit appropriate treatment options.
- Selection of dry filtration is preferred to wet scrubbing.
- Heat treatment furnace burner design for low NO_x emissions (>35% reduction).
- Pickling acid regeneration and reuse.
- Reduced NOx emissions from pickling (where nitric acid is used) by at lease 70% using e.g. H_2O_2.

4.3 CONTAINMENT OF EMISSIONS:

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and environmental site constraints).

- Overground pipelines and transfer lines.
- No dry sweeping or washing of spillages - vacuum systems preferred.
- Overfilling protection on bulk storage tanks.
- Shot-blasting to be carried out in a totally enclosed systems extracted to a filter unit.

4.4 TECHNOLOGIES FOR RECOVERY AND RECYCLE:

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and environmental site constraints).

- Reuse of metal wastes (finishing etc.).
- Recycle of water.

4.5 SPECIFIC TECHNOLOGIES FOR TREATING EMISSIONS TO AIR:

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and environmental site constraints).

- Cyclones (T1).
- Filtration (fabric filters normally adequate) (T2).
- Electrostatic precipitators and mist eliminators (T3).
- Wet scrubbers (T4).

4.6 SPECIFIC TECHNOLOGIES FOR TREATING WATER EMISSIONS

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and environmental site constraints).

- Coagulation/flocculation/precipitation (F1).
- Sedimentation/filtration/flotation (F2).
- pH correction/neutralisation (F3).
- Electrodialysis (F4).
- Ion-exchange resin beds (F5).

4.7 SPECIFIC TECHNOLOGIES FOR THE TREATMENT AND DISPOSAL OF WASTES:

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and environmental site constraints).

4.7.1. Sludge Treatment

- Gravity thickening.
- Filtration.
- Centrifugation.

4.7.2. Disposal

- Waste encapsulation
- Engineered landfill of wastes
- Recovery and reuse in downstream processing or another industry.

Table 4. 1 - Summary of Technologies for Treating Emissions to Air (Symbols refer to Section 4.5)

Emissions	Treatment
Particulate, Metals, Metal Oxides.	T1, T2, T3
Oil Mist	T1, T3
Acids/Alkalis etc.	T4
Nitric Oxides - Thermal	Burner Technology
Nitric Oxides - Acid Mist	Peroxide addition

Table 4. 2 - Summary of Technologies for Treatment of Water Emissions (Symbols refer to Section 4.6)

Emission	Treatment
Acids/Alkalis	F3
Metals	F1, F2, F3, F4, F5
Oils	F1, F2

5. EMISSION LIMIT VALUES

5. 1 REFERENCE CONDITIONS

The reference conditions for concentrations of substances in emissions to air from contained sources are:

Temperature 273 ^{o}K; Pressure 101.3 kPa; no correction for water vapour content.

These units and reference conditions may not be suitable for continuous monitoring methods and may, by agreement with the Agency, be converted for day to day control purposes into values more suitable for the available instrumentation.

5. 2 INTERPRETATION OF COMPLIANCE

5. 2.1 Emissions to Air

For **continuously monitored** emissions, the following will be required for compliance with measurements based on 30 minute mean values (unless otherwise stated):

(Achievement of ELV concentrations by the introduction of dilution air is not permitted.).

(i) 97% of all 30 minute mean measurements shall be below 1.2 times the emission limit.

(ii) No 30 minute mean measurement shall exceed 2.0 times the emission limit.

(iii) All daily mean values shall be less than the emission concentration limit.

Where **periodic monitoring** is used to check compliance, all samples should meet the consent conditions.

5. 2.2 Emissions to waters

The limit values for discharges to water are based on 24 hour flow proportional composite samples taken over a representative production period.

5. 3 EMISSIONS TO AIR

Emissions to air under normal operation, including start-up and shutdown, should be free from visible smoke and should not give rise to a nuisance odour detectable beyond the site boundary. Table 5. 1 contains the emission limit values.

Table 5. 1 - Emission Limit Values for Emissions to Air

Substance	Concentration
Particulate matter (mg/m^3)	20
Metals	As per T.A. Luft (1986)
Oil Mist (mg/m^3)	20
Acid Vapours	As per T.A. Luft (1986)

NOTE 1: Achievement of ELV concentrations by the introduction of dilution air is not permitted

5. 4 RELEASES TO WATER

Effluent should be minimised by recycling and re-use wherever practicable. The use of lower quality water may be possible for some parts of the process rather than fresh water.

All releases to waters are subject to a licence from the Agency. However any discharge to sewer will require the consent of the sanitary authority. BATNEEC to minimise the release of substances will generally include minimisation at source and either specific treatment of contaminated waste streams to remove particular substances or co-treatment of combined effluent streams or both. The Emission Limit Values for effluent discharges to waters are set out in Table 5. 2.

Table 5.2 - Emission Limit Values for Discharges to Water*
(These Values apply prior to any dilution with e.g. uncontaminated stormwaters or cooling waters)

Constituent Group or Parameter	Limit Value	Notes
pH	6 - 9	3
BOD (mg/1)	25	3
Number of Toxicity Units	1	1,3
Mineral Oil (mg/l)	20	3
Fish Tainting	No tainting	2
Lead (mg/l)	0.5	3
Nickel (mg/l)	0.5	3
Zinc (mg/l)	0.5	3
Chromium (VI) (mg/l)	0.1	3
Chromium (Total) (mg/l)	0.5	3
Copper (mg/l)	0.5	3
Total Nitrogen (as N)**	> 80% Removal **or** 15 mg/l	3,4

* All values refer to daily averages, except where otherwise stated to the contrary, and except for pH which refers to continuous values.

** Only applicable to waters subject to eutrophication where nitrogen is the critical parameter.

Notes for Table 5.2:

1. The toxicity of the effluent shall be determined on an appropriate aquatic species. The number of Toxicity Units (TU) = 100/96 hr LC50 in percentage vol/vol. so that higher TU values reflect greater levels of toxicity. For each TU at least 20 dilutions of the effluent volume must be available in the receiving system.

2. No substance shall be discharged in a manner which, or at a concentration which, following initial dilution causes tainting of fish or shellfish, interferes with normal patterns of fish migration or which accumulates in sediments or biological issues to the detriment of fish, wildlife or their predators.

3. Consent conditions for these parameters for discharge to municipal treatment plants can be established with the Licensing Authority, and different values may apply.

4. Reduction in relation to influent load. Total Nitrogen means the sum total of Kjeldahl-nitrogen plus nitrate-nitrogen plus nitrite-nitrogen.

6. COMPLIANCE MONITORING

The methods proposed for monitoring the emissions from these sectors are set out below.

6. 1 EMISSIONS TO AIR

1. Periodic monitoring, (taking account of the nature, magnitude and variability of the emission) of particulates (incl. metals) and oil mist.

2. Weekly maintenance inspections of all air handling plant (including pressure drop tests across filters).

6. 2 WASTE WATER DISCHARGES:

1. Establish existing conditions prior to start-up, of key emission constituents and salient flora and fauna.

2. Daily monitoring of flow and volume, continuous monitoring of pH. Monitoring of other relevant parameters as deemed by the Agency.

3. Monitoring of influent and effluent from the waste water treatment plant to establish an early warning of any difficulties in waste water treatment plant, or unusual loads.

4. Periodic fish tainting and toxicity tests where appropriate, taking account of the nature, magnitude and variability of the emission and the reliability of the controls.

6. 3 SOLID WASTE MONITORING:

1. The recording in a register of the types, quantities, date and manner of disposal of all wastes.

2. Leachate testing of sludges and other material as appropriate being sent for landfilling.

7. PRINCIPAL REFERENCES

7.1 IRELAND

7.1.1 Air Pollution Act, 1987

7.1.2 Environmental Protection Agency Act, 1992.

7.1.3 Local Government (Water Pollution) Acts 1977 and 1990.

7.2 E.C.

7.2.1 Technical Note on Best Available Techniques (BAT) to Reduce Emissions of Pollutants into the Air from Hot and Cold Rolling Mills.
(CITEPA Draft, April 1993).

7.3 GERMANY

7.3.1 T.A. Luft 1986.

Appendix 1

MAIN EMISSIONS

1 INTRODUCTION:

In this section, the major sources of emissions to air and water are identified, as are the principal sources of waste from the sector. It should be borne in mind that the identified list of sources is not all encompassing, nor will every plant falling within an individual sector have every one of the emissions which are associated with the sector as a whole.

For each subsector, emissions to air and water are considered under two headings, the first covering fugitive and unscheduled emissions and the second specific process emissions. Some of the latter are considered to have little potential environmental significance and these are designated as minor (m) and are not assigned emission limit values. A summary of the constituents of each significant release is given at the end of the section.

2 SOURCES OF EMISSION TO AIR FROM:

2.1 Fugitive and Unscheduled Emissions

- Building losses, through windows, open doors, vents.
- Workplace losses through ventilation.

2.2 Process Emissions (Symbols refer to Table A1)

- Reheat emissions (S1).
- Surface preparation (Milling, grinding, etc.) (S1).
- Hot rolling (S2).
- Cold rolling pre-treatment (e.g. acid cleaning, alkali cleaning) (S3).
- Cold rolling (S2).
- Annealing/tempering (S1).
- Forging (Heating, quenching, annealing etc.) (S1 & S2).
- Drawing (Heating etc.) (S1 & S2).

- Pickling/scale removal (S4).
- Stamping and pressing (m).

3. SOURCES OF EMISSIONS TO WATER FROM: (SYMBOLS REFER TO TABLE A2)

3.1 Spills and Diffuse Sources

- Bund drainage.
- Spillages.
- Pipework leaks.

3.2 Processes Emissions

- Laboratory effluent (m).
- Pickling/scale removal (E1).
- Abatement system effluents (e.g. mist eliminators etc.) (E2).
- Hot and cold rolling (E3).
- Quench (E2).

4. SOURCES OF WASTE FROM:

- Dust from abatement systems (W1).
- Sludge from WWTP (W2).
- Metal Waste (W3).
- Oils (W4).
- Contaminated drums, equipment, protective clothing (W5).

5. RELEASES

The substances most likely to be present in the release to the environment and of principal concern in the processes covered by this note are given below. A licence applicant should identify and quantify all environmentally significant emissions (including heat discharges) from the process.

Table A1 - Summary of Sources and Emissions to Air (Symbols refer to Section 2 in Appendix)

Source	Emission
S1	NO_x, particulates (i.e. metals) CO SO_2
S2	Oil Mist
S3	H_2SO_4, HCl, Caustic, etc.
S4	Nitric acid fumes, HF etc.

Table A2 - Summary of Sources and Emissions to Water (Symbols refer to Section 3 in Appendix)

Source	Emission
E1	Metals, acids (e.g. H_2SO_4, HCl, HNO_3, HF etc.)
E2	Oils, particulates (incl. metals)
E3	HCl, H_2SO_4, oil, caustic, degreasing agents.

Table A3 - Summary of Other Releases
(Symbols refer to Section 4 in Appendix)

Source	Emission
W1	Iron, steel, metals and metal oxides
W2	Iron, metals (e.g. Cr, Cu, Ni etc.)
W3	Iron, steel, copper, aluminium etc.
W4	Oil
W5	Process chemicals