

Emission limit values: Comparative tables for basic chemicals, new or substantially changed installations in the EU

The present document contains comparative tables of emission limit values for chemical industry in the EU. The sectors considered are basic chemicals, e.g. chemical installations for the production of *basic organic chemicals* (Category 4.1 as defined in Annex I of the IPPC Directive) and *basic inorganic chemicals* (category 4.2). The tables concern new or substantially changed installations.

There is a [companion document](#) concerning existing installations.

See below for further explanations.

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Explanatory notes

The IPPC Directive 96/61/EC prescribes that member countries must report certain information on industrial activities to the European Commission. The information to be reported includes representative data on emission limit values. The data are classified according to categories of industrial activities, cf. Annex 1 of the directive.

The information presented has been compiled from EU Member States through a questionnaire, as prescribed by the IPPC directive. The reports from the member states have been compiled in the report:

Analysis of Member States' first implementation reports on the IPPC Directive (EU-15) by LDK-ECO Environmental Consultants S.A. Athens, Greece. (June 2004). The report was prepared for the European Commission, Directorate General Environment, Directorate G: Sustainable Development and Integration, Unit G.2 Industry and Environment.

This report is available through

http://europa.eu.int/comm/environment/ippc/ippc_ms_implementation.htm

The information presented on the subsequent pages is extracted from that report, and concerns the sector Basic chemicals, new or substantially changed installations.

Where "new" and "old" reports and limit values are referred to, it refers to the years 2003, respectively 2001.

The emission limit values in the tables are meant to be representative values of permits issued in the Member States. Ideally, they should represent the limit value for the median installation in a given category.

The abbreviations used in the subsequent tables have the following meaning:

| | |
|-------|---|
| No I. | No installations |
| C | Continuous measurement method including continuous sampling |
| P | Periodical measurement method |
| Calc | Calculation method using consumption of raw materials |
| HHAV | Half hourly average value |
| HAV | Hourly average value |
| DAV | Daily average value |

MAV Monthly average value
YAV Yearly average value

Notes on remarks or text:

- Text in italics means that this text (remarks or ELV) was not comprised anywhere in the new reports of the Member States (MS). They are usually highlighted in yellow colour, but in some occasions in green colour as well (there is no difference concerning these colours)
- Yellow highlighted text means that this text (either remark or ELV) needs to be checked for small differences that are met between the two articles.
- Yellow highlighted remarks under the label "FOE". These remarks were made by the person that has checked the aggregated tables, in order to provide additional information.
- Green highlighted text means that this text (either remark or ELV) was found in the new reports of the Member States (MS) and added to the tables.

Notes on Pollutant's Cells:

- Grey cells in general indicate that new or different ELV are found in the new reports (under Article 16(3)) comparing to the old aggregated tables (Article 16(1)). Therefore, in most cases, there are two cells per pollutant, the one comprising the old ELV (where the values are in italics) and another one that comprises the new ELV. However, in some cases, the old values are not in italics and placed in a white cell, indicating that the new ELV (in grey cell) are additional ELV and do not replace the old ELV.
- Grey rows in particular, indicate that the comprised pollutants were not included in the old aggregated tables and are considered in the present tables, under Article 16(3).

Notes on columns:

- The columns referring to UK's ELV are in a pale-green colour that indicates the submission of ELV by this MS, for the first time.

4.1.1 Chemical installations for the production of benzene

Typically, there are two rows for each pollutant, corresponding to "old" and "new" reports from Member States. See the *Explanatory Notes* on the first page for explanation of color coding etc.

| Air pollutant | A | B | DK | FIN | F ^{F1} HHAV | D | EL | IRL |
|------------------|-------|---|-------|-------|-------------------------------------|--|-------|-------|
| Particulates | No I. | | No I. | No I. | 100 ¹ 40 ³ | 50 ^{DAV} 150 | No I. | No I. |
| | | | | | (mg/m ³) | 20 ⁴ DAV HHA 150 ⁵ (mg/m ³) | | |
| PM ₁₀ | No I. | | No I. | No I. | None | None | No I. | No I. |
| CO | No I. | | No I. | No I. | None | None ⁶ | No I. | No I. |
| NOx | No I. | | No I. | No I. | 500 ⁷ | 500 ^{DAV} 350 ⁹ DAV HHA | No I. | No I. |
| | | | | | (mg/m ³) | (mg/m ³) | | |
| SOx | No I. | | No I. | No I. | 300 ¹⁰ | 500 ^{DAV} 35 ¹² DAV HHA | No I. | No I. |
| | | | | | (mg/m ³) | (mg/m ³) | | |
| VOC | No I. | | No I. | No I. | 110 ¹³ | 20-150 ¹⁶ 20 ¹⁶ DAV HHA 100 ¹⁷ 50 ¹⁸ (mg/m ³) | No I. | No I. |
| | | | | | (mg/m ³) | (mg/m ³) | | |

F¹ Reference conditions: 273k, 101.3 kPa

¹ for flows < 1kg/h

² Values from national regulation.

³ for flows > 1kg/h

⁴ alternative ELV: 0.2 kg/h

⁵ if mass flow < 0.2 kg/h

⁶ minimisation obligation because of reproduction toxicity

⁷ for flows > 1kg/h

⁸ Values from national regulation.

⁹ alternative ELV: 1.8 kg/h

¹⁰ for flows > 1kg/h

¹¹ Values from national regulation.

¹² alternative ELV: 1.8 kg/h

¹³ for flows > 2kg/h with the exception of methane the limit value is around 20 mg/m³ for 39 COV considered as dangerous.

¹⁴ Values from national regulation.

¹⁵ TOC (Total Organic Compounds), valid for organic substances of different classes

¹⁶ sum of class I organic compounds; alternative ELV: 0.1 kg/h; see class definition in Annex 4 of GBR 2

¹⁷ sum of class II organic compounds; alternative ELV: 0.5 kg/h; also valid for sum of coinciding class I and II compounds

¹⁸ sum of organic compounds determined as total carbon; alternative ELV: flow of total organic carbon 0.5 kg/h

| Air pollutant | I | L | NL | P | E | S | UK |
|------------------|-------|---|-------|---|-------|-------|----|
| Particulates | No I. | | No I. | | No I. | No I. | |
| PM ₁₀ | No I. | | No I. | | No I. | No I. | |
| CO | No I. | | No I. | | No I. | No I. | |
| NO _x | No I. | | No I. | | No I. | No I. | |
| SO _x | No I. | | No I. | | No I. | No I. | |
| VOC | No I. | | No I. | | No I. | No I. | |

4.1.2 Chemical installations for the production of ethylene oxide

| Air pollutant | A | B | DK | FIN | F ^{F6} HHAV | D | EL | IRL |
|------------------|-------|---|-------|-------|---|--|-------|-------|
| Particulates | No I. | | No I. | No I. | 100 ^{19, 20} 40 ²¹ | 50 ^{DAV} 150 20 ²² DAV HHA V 150 ²³ HHA V (mg/m ³) | No I. | No I. |
| PM ₁₀ | No I. | | No I. | No I. | None | None | No I. | No I. |
| CO | No I. | | No I. | No I. | None | None | No I. | No I. |
| NO _x | No I. | | No I. | No I. | 500 ^{24, 25} | 500 ^{DAV} 350 ²⁶ DAV HHA V (mg/m ³) | No I. | No I. |
| SO _x | No I. | | No I. | No I. | 300 ^{27, 28} | 35 ²⁹ DAV HHA V (mg/m ³) | No I. | No I. |
| VOC | No I. | | No I. | No I. | 110 ^{30, 31} | 20-150 ³² 20 ³³ DAV HHA V 100 ³⁴ 50 ³⁵ (mg/m ³) | No I. | No I. |
| Methane | No I. | | No I. | No I. | None | None 50 ³⁶ (mg/m ³) | No I. | No I. |
| Ethylene | No I. | | No I. | No I. | None | 100 ^{37, DAV} 50 ³⁸ DAV HHA V (mg/m ³) | No I. | No I. |
| Formaldehyde | No I. | | No I. | No I. | None | 20 ^{39, DAV} 20 ⁴⁰ DAV HHA V (mg/m ³) | No I. | No I. |

^{F6} Reference conditions: 273 k, 101.3 kPa

¹⁹ for flows < 1 kg/h

²⁰ Values from national regulation.

²¹ for flows > 1 kg/h

²² alternative ELV: 0.2 kg/h

²³ if mass flow < 0.2 kg/h

²⁴ for flows > 1kg/h

²⁵ Values from national regulation.

²⁶ alternative ELV: 1.8 kg/h

²⁷ for flows > 1kg/h

²⁸ Values from national regulation.

²⁹ alternative ELV: 1.8 kg/h

³⁰ for flows > 2kg/h and with the exception of methane the limit value around 20 mg/m³ for 39 VOC considered as dangerous

³¹ Values from national regulation.

³² TOC (Total Organic Compounds), valid for organic substances of different classes

³³ sum of class I organic compounds; alternative ELV: 0.1 kg/h; see class definition in Annex 4 of GBR 2

³⁴ sum of class II organic compounds; alternative ELV: 0.5 kg/h; also valid for sum of coinciding class I and II compounds

³⁵ organic compounds determined as total carbon; alternative ELV: flow of total carbon 0.5 kg/h

³⁶ organic compounds determined as total carbon; alternative ELV: flow of total carbon 0.5 kg/h, emissions of methane are limited as sum of organic compounds determined as total carbon; see VOC

³⁷ valid for sum of substances of this class

³⁸ organic compounds determined as total carbon; alternative ELV: flow of total carbon 0.5 kg/h

³⁹ valid for sum of substances of this class

⁴⁰ sum of class I organic compounds; alternative ELV: 0.1 kg/h; see class definition in Annex 4 of GBR 2

| Air pollutant | I | L | NL | P | E | S | UK |
|------------------------|----------|----------|-----------|----------|----------|----------|-----------|
| Particulates | No I. | | No I. | No I. | No I. | No I. | |
| PM₁₀ | No I. | | No I. | No I. | No I. | No I. | |
| CO | No I. | | No I. | No I. | No I. | No I. | |
| NOx | No I. | | No I. | No I. | No I. | No I. | |
| SOx | No I. | | No I. | No I. | No I. | No I. | |
| VOC | No I. | | No I. | No I. | No I. | No I. | |
| Methane | No I. | | No I. | No I. | No I. | No I. | |
| Ethylene | No I. | | No I. | No I. | No I. | No I. | |
| Formaldehyde | No I. | | No I. | No I. | No I. | No I. | |

4.1.3 Chemical installations for the production of formaldehyde

| Air pollutant | A | B | DK | FIN | F ^{F7 HHAV} | D | EL | IRL |
|------------------|-------|---|-------|-------|--|--|-------|-------|
| Particulates | No l. | | No l. | No l. | 100 ^{1, 2} 40 ³ (mg/m ³) | 50 ^{DAV} 150 20 ^{4 DAV} HHA 150 ^{5 HHAV} (mg/m ³) | No l. | No l. |
| PM ₁₀ | No l. | | No l. | No l. | None | None | No l. | No l. |
| CO | No l. | | No l. | No l. | None | None | No l. | No l. |
| NO _x | No l. | | No l. | No l. | 500 ^{6, 7, 8} (mg/m ³) | 500 ^{DAV} 350 ^{9 DAV} HHA (mg/m ³) | No l. | No l. |
| VOC | No l. | | No l. | No l. | 110 ^{10, 11} (mg/m ³) | 20-150 ¹² 20 ^{13 DAV} HHA 100 ¹⁴ 50 ¹⁵ (mg/m ³) | No l. | No l. |
| Formaldehyde | No l. | | No l. | No l. | None | 20 ^{16, DAV} (mg/m ³) | No l. | No l. |
| Methanol | No l. | | No l. | No l. | None | 20 ^{17 DAV} HHA (mg/m ³) 150 ^{18, DAV} 20 ^{19 DAV} HHA (mg/m ³) | No l. | No l. |
| Dimethyl ether | No l. | | No l. | No l. | None | 150 ^{20, DAV} 50 ^{21 DAV} HHA (mg/m ³) | No l. | No l. |

^{F7} Reference conditions: 273 k, 101.3 kPa

¹ for flows < 1 kg/h

² Values from national regulation.

³ for flows > 1 kg/h

⁴ alternative ELV: 0.2 kg/h

⁵ if mass flow < 0.2 kg/h

⁶ for flows > 2kg/h and with the exception of methane the limit value around 20 mg/m³ for 39 VOC considered as dangerous

⁷ for the flows > 1 kg/h

⁸ Values from national regulation.

⁹ alternative ELV: 1.8 kg/h

¹⁰ for flows > 2kg/h and with the exception of methane the limit value around 20 mg/m³ for 39 VOC considered as dangerous

¹¹ Values from national regulation.

¹² TOC (Total Organic Compounds), valid for organic substances of different classes

¹³ sum of class I organic compounds; alternative ELV: 0.1 kg/h; see class definition in Annex 4 of GBR 2

¹⁴ sum of class II organic compounds; alternative ELV: 0.5 kg/h; also valid for sum of coinciding class I and II compounds

¹⁵ sum of organic compounds determined as total carbon; alternative ELV: flow of total organic carbon 0.5 kg/h

¹⁶ valid for sum of substances of this class

¹⁷ sum of class I organic compounds; alternative ELV: 0.1 kg/h; see class definition in Annex 4 of GBR 2

¹⁸ valid for sum of substances of this class

¹⁹ sum of class I organic compounds; alternative ELV: 0.1 kg/h; see class definition in Annex 4 of GBR 2

²⁰ valid for sum of substances of this class

²¹ sum of organic compounds determined as total carbon; alternative ELV: flow of total organic carbon 0.5 kg/h

| Air pollutant | I | L | NL | P | E | S | UK |
|------------------------|-------|---|-------|---|-------|-------|----|
| Particulates | No I. | | No I. | <i>None</i> | No I. | No I. | |
| | | | | 300 ^{P1} (mg/Nm ³) | | | |
| PM₁₀ | No I. | | No I. | No data | No I. | No I. | |
| CO | No I. | | No I. | <i>None</i> | No I. | No I. | |
| | | | | 1000 ^{P1} 20 ^{P2} (mg/Nm ³) | | | |
| NO_x | No I. | | No I. | <i>None</i> | No I. | No I. | |
| | | | | 1500 ^{P1} 10 ^{P2} (mg/Nm ³) | | | |
| VOC | No I. | | No I. | <i>None</i> | No I. | No I. | |
| | | | | 50 ^{P1} (mg/Nm ³) | | | |
| Formaldehyde | No I. | | No I. | <i>None</i> | No I. | No I. | |
| | | | | 5 ^{P2} (mg/Nm ³) | | | |
| Methanol | No I. | | No I. | No data | No I. | No I. | |
| Dimethyl ether | No I. | | No I. | No data | No I. | No I. | |

^{P1} Reference conditions: 8% O₂
^{P2} Reference conditions: 3% O₂

4.1.4 Chemical installations for the production of vinyl chlorine monomer

| Air pollutant | A | B | DK | FIN | F ^{F8 HHAV} | D | EL | IRL |
|------------------------|-------|---|-------|-------|---|--|-------|-------|
| Particulates | No I. | | No I. | No I. | 100 ^{22, 23} 40 ²⁴ | 50 ^{DAV} 150 ^{DAV} 20 ²⁵ DAV HHA V 150 ²⁶ HHA V (mg/m ³) | No I. | No I. |
| PM ₁₀ | No I. | | No I. | No I. | None | None | No I. | No I. |
| CO | No I. | | No I. | No I. | None | None ²⁷ | No I. | No I. |
| NO _x | No I. | | No I. | No I. | 500 ^{28, 29} | 500 ^{DAV} 350 ³⁰ DAV HHA V (mg/m ³) | No I. | No I. |
| SO _x | No I. | | No I. | No I. | 300 ^{31, 32} | 500 ^{DAV} 35 ³³ DAV HHA V (mg/m ³) | No I. | No I. |
| VOC | No I. | | No I. | No I. | 110 ^{34, 35} | 20-150 ³⁶ 20 ³⁷ DAV HHA V 100 ³⁸ 50 ³⁹ (mg/m ³) | No I. | No I. |
| HCl | No I. | | No I. | No I. | 50 ^{40, 41} | 30 ⁴² DAV HHA V (mg/m ³) | No I. | No I. |
| HF | No I. | | No I. | No I. | 5 ⁴³ (mg/m ³) | 5 ⁴⁴ DAV HHA V (mg/m ³) | No I. | No I. |
| Vinyl chloride monomer | No I. | | No I. | No I. | None | 5 ^{DAV} 1 ⁴⁶ DAV HHA V | No I. | No I. |

F8 Reference conditions: 273 k, 101.3 kPa

²² for flows < 1 kg/h

²³ Values from national regulation.

²⁴ for flows > 1 kg/h

²⁵ alternative ELV: 0.2 kg/h

²⁶ if mass flow < 0.2 kg/h

²⁷ minimisation obligation because of reproduction toxicity

²⁸ for flows > 1 kg/h

²⁹ Values from national regulation.

³⁰ alternative ELV: 1.8 kg/h

³¹ for flows > 1 kg/h

³² Values from national regulation.

³³ alternative ELV: 1.8 kg/h

³⁴ for flows > 2 kg/h and with the exception of methane the limit value is around 20 mg/m³ for 39 VOC considered as dangerous

³⁵ Values from national regulation.

³⁶ TOC (Total Organic Compounds), valid for organic substances of different classes

³⁷ sum of class I organic compounds; alternative ELV: 0.1 kg/h; see class definition in Annex 4 of GBR 2

³⁸ sum of class II organic compounds; alternative ELV: 0.5 kg/h; also valid for sum of coinciding class I and II compounds

³⁹ sum of organic compounds determined as total carbon; alternative ELV: flow of total organic carbon 0.5 kg/h

⁴⁰ for flows > 1 kg/h

⁴¹ Values from national regulation.

⁴² sum of NH₃ and gaseous chlorine compounds (class III gaseous inorganic compounds); alternative ELV: 0.15 kg/h

⁴³ for flows > 500 g/h

⁴⁴ Values from national regulation.

⁴⁵ sum of Br, F and its gaseous compounds as well as Cl₂, H₂S and HCN (class II gaseous inorganic compounds); alternative ELV: 15 g/h

| Air pollutant | A | B | DK | FIN | F ^{F8 HHAV} | D | EL | IRL |
|---------------------|-------|---|-------|-------|----------------------|--|-------|-------|
| | | | | | | (mg/m ³) | | |
| Ethylene dichloride | No l. | | No l. | No l. | None | 150 ^{47 DAV} | No l. | No l. |
| | | | | | | 1 ^{48 DAV HHAV} (mg/m ³) | | |
| PCDD/PCDF | No l. | | No l. | No l. | None | None ⁴⁹ | No l. | No l. |
| | | | | | | 0.1 ⁵⁰ (ng/m ³) | | |

⁴⁶ sum of class III carcinogenic compounds; alternative ELV: 2.5 g/h; also valid for sum of coinciding class I to III carcinogenic compounds; minimisation obligation

⁴⁷ 1,2-ethylene dichloride

⁴⁸ sum of class III carcinogenic compounds; alternative ELV: 2.5 g/h; also valid for sum of coinciding class I to III carcinogenic compounds; minimisation obligation

⁴⁹ minimisation obligation

⁵⁰ alternative ELV: 0.25 µg/h; minimisation obligation

| Air pollutant | I | L | NL | P | E | S | UK |
|-------------------------------|----------|----------|-----------|----------|----------|----------|-----------|
| Particulates | No I. | | No I. | No I. | No I. | No I. | |
| PM₁₀ | No I. | | No I. | No I. | No I. | No I. | |
| CO | No I. | | No I. | No I. | No I. | No I. | |
| NO_x | No I. | | No I. | No I. | No I. | No I. | |
| SO_x | No I. | | No I. | No I. | No I. | No I. | |
| VOC | No I. | | No I. | No I. | No I. | No I. | |
| HCl | No I. | | No I. | No I. | No I. | No I. | |
| HF | No I. | | No I. | No I. | No I. | No I. | |
| Vinyl chloride monomer | No I. | | No I. | No I. | No I. | No I. | |
| Ethylene dichloride | No I. | | No I. | No I. | No I. | No I. | |
| PCDD/PCDF | No I. | | No I. | No I. | No I. | No I. | |

4.2.1 Chemical installations for the production of ammonia

| Air pollutant | A | B | DK | FIN | F ^{HHAV} | D ^{HHAV} | EL | IRL |
|------------------|-------|---|-------|-------|---|--|-------|-------|
| Particulates | No l. | | No l. | No l. | 100 ^{51, 52} 40 ⁵³ | 50 ⁵⁴ 150 ⁵⁵ | No l. | No l. |
| | | | | | (mg/m ³) | 20 ⁵⁴ DAV 150 ⁵⁵ | | |
| PM ₁₀ | No l. | | No l. | No l. | None | None | No l. | No l. |
| CO | No l. | | No l. | No l. | None | None ⁵⁶ | No l. | No l. |
| NOx | No l. | | No l. | No l. | 500 ^{57, 58} | 500 ⁵⁹ DAV HHAV | No l. | No l. |
| | | | | | (mg/m ³) | 350 ⁵⁹ DAV (mg/m ³) | | |
| SOx | No l. | | No l. | No l. | 300 ^{60, 61} | 500 ⁶² DAV HHAV | No l. | No l. |
| | | | | | (mg/m ³) | 350 ⁶² DAV (mg/m ³) | | |
| H ₂ S | No l. | | No l. | No l. | None | 5 ^{HHAV} 3 ⁶³ | No l. | No l. |
| | | | | | | (mg/m ³) | | |
| Amines | No l. | | No l. | No l. | None | 20 ⁶⁴ 100 ⁶⁵ 150 ⁶⁶ | No l. | No l. |
| | | | | | | 20 ⁶⁷ 100 ⁶⁸ 150 ⁶⁹ (mg/m ³) | | |
| Ammonia | No l. | | No l. | No l. | 50 ⁷⁰ | None 30 ⁷¹ | No l. | No l. |
| | | | | | (mg/m ³) | (mg/m ³) | | |

⁵¹ for the flows < 1 kg/h

⁵² Values from national regulation.

⁵³ for the flows > 1 kg/h

⁵⁴ alternative ELV: 0.2 kg/h

⁵⁵ if mass flow < 0.2 kg/h

⁵⁶ minimisation obligation because of reproduction toxicity

⁵⁷ flows >1 kg/h

⁵⁸ Values from national regulation.

⁵⁹ alternative ELV: 1.8 kg/h

⁶⁰ for the flows > 1 kg/h

⁶¹ Values from national regulation.

⁶² alternative ELV: 1.8 kg/h

⁶³ alternative ELV: 15 g/h

⁶⁴ valid for different classes

⁶⁵ valid for different classes

⁶⁶ valid for different classes

⁶⁷ sum of class I organic compounds; alternative ELV: 0.1 kg/h; see class definition in Annex 4 of GBR 2

⁶⁸ sum of class II organic compounds; alternative ELV: 0.5 kg/h; also valid for the sum of coinciding class I and II compounds

⁶⁹ sum of organic compounds determined as total carbon; alternative ELV: flow of total organic carbon 0.5 kg/h

⁷⁰ Values from national regulation.

⁷¹ alternative ELV: 0.15 kg/h

| Air pollutant | I | L | NL | P | E | S | UK |
|------------------------|----------|----------|-----------|----------|----------|----------|-----------|
| Particulates | No I. | | No I. | | No I. | No I. | |
| PM₁₀ | No I. | | No I. | | No I. | No I. | |
| CO | No I. | | No I. | | No I. | No I. | |
| NO_x | No I. | | No I. | | No I. | No I. | |
| SO_x | No I. | | No I. | | No I. | No I. | |
| H₂S | No I. | | No I. | | No I. | No I. | |
| Amines | No I. | | No I. | | No I. | No I. | |
| Ammonia | No I. | | No I. | | No I. | No I. | |

4.2.2 Chemical installations for the production of nitric acid

| Air pollutant | A | B | DK | FIN | F ^{F8} HHAV | D ^{HHAV} | EL | IRL |
|------------------|-------|---|-------|-------|---|--|-------|-------|
| Particulates | No l. | | No l. | No l. | 100 ^{72, 73} 40 ⁷⁴ | DAV ^{HHAV} 50 150 | No l. | No l. |
| | | | | | (mg/m ³) | 20 ⁷⁵ DAV 150 ⁷⁶ | | |
| PM ₁₀ | No l. | | No l. | No l. | None | None | No l. | No l. |
| N ₂ O | No l. | | No l. | No l. | 7 | None | No l. | No l. |
| | | | | | (kg/t) | 800 | | |
| NO _x | No l. | | No l. | No l. | 500 ^{77, 78} | 450 ^{DAV} HHAV | No l. | No l. |
| | | | | | (mg/m ³) | 200 ^{DAV} (mg/m ³) | | |
| HNO ₃ | No l. | | No l. | No l. | 1.3 (kg/t) | None | No l. | |

^{F8} Reference conditions: 273 k, 101.3 kPa

⁷² For flows < 1 kg/h

⁷³ Values from national regulation.

⁷⁴ for flows > 1 kg/h

⁷⁵ alternative ELV: 0.2 kg/h

⁷⁶ if mass flow < 0.2 kg/h

⁷⁷ for flows > 1kg/h

⁷⁸ Values from national regulation.

| Air pollutant | I | L | NL | P | E | S | UK |
|------------------------|----------|----------|-----------|----------|----------|----------|-----------|
| Particulates | No I. | | No I. | | No I. | No I. | |
| PM₁₀ | No I. | | No I. | | No I. | No I. | |
| N₂O | No I. | | No I. | | No I. | No I. | |
| NO_x | No I. | | No I. | | No I. | No I. | |
| HNO₃ | No I. | | No I. | | No I. | No I. | |

4.2.3 Chemical installations for the production of phosphoric acid

| Air pollutant | A | B | DK | FIN | F ^{F9 HHAV} | D | EL | IRL |
|------------------|-------|---|-------|-------|---|-------------------------------|-------|-------|
| Particulates | No l. | | No l. | No l. | 100 ⁷⁹ ⁸⁰ 40 ⁸¹ | DAV HHAV 50 150 | No l. | No l. |
| | | | | | (mg/m ³) | None (mg/m ³) | | |
| PM ₁₀ | No l. | | No l. | No l. | None | None | No l. | No l. |
| HF | No l. | | No l. | No l. | 10 ⁸² ⁸³ | 5 ^{DAV HHAV} None | No l. | No l. |
| | | | | | (mg/m ³) | (mg/m ³) | | |

F⁹ 273 k, 101.3 kPa

⁷⁹ for flows < 1 kg/h

⁸⁰ Values from national regulation.

⁸¹ for flows > 1 kg/h

⁸² for flows > 500 g/h

⁸³ Values from national regulation.

| Air pollutant | I | L | NL | P | E | S | UK |
|------------------------|----------|----------|-----------|----------|----------|----------|-----------|
| Particulates | No I. | | No I. | No I. | No I. | No I. | |
| PM₁₀ | No I. | | No I. | No I. | No I. | No I. | |
| HF | No I. | | No I. | No I. | No I. | No I. | |

4.2.4 Chemical installations for the production of sulphuric acid

| Air pollutant | A | B | DK | FIN | F ^{F9 HHAV} | D | EL | IRL |
|--------------------------------|-------|---|-------|-------|---|---|-------|-------|
| Particulates | No l. | | No l. | No l. | 100 ^{84, 85} 40 ⁸⁶ | DAV HHAV 50 150 | No l. | No l. |
| | | | | | (mg/m ³) | 20 ^{87 DAV HHAV} 150 ^{88 HHAV} (mg/m ³) | | |
| PM ₁₀ | No l. | | No l. | No l. | None | None | No l. | No l. |
| SO _x | No l. | | No l. | No l. | 2.6 ⁸⁹ | None ⁹⁰ | No l. | No l. |
| | | | | | (kg/t) | 97.5% - 99.6% ⁹¹ Conversion factor | | |
| H ₂ SO ₄ | No l. | | No l. | No l. | None | None | No l. | No l. |

^{F9} 273 k, 101.3 kPa

⁸⁴ for flows < 1 kg/h

⁸⁵ Values from national regulation.

⁸⁶ for flows > 1 kg/h

⁸⁷ alternative ELV: 0.2 kg/h

⁸⁸ if mass flow < 0.2 kg/h

⁸⁹ Values from national regulation.

⁹⁰ regulation according conversion rate

⁹¹ value of minimum conversion factor depending on the process applied

| Air pollutant | I | L | NL ^{NL1} | P | E | S | UK |
|--------------------------------|-------|---|---|-------|-------|-------|----|
| Particulates | No I. | | No I. | No I. | No I. | No I. | |
| | | | None | | | | |
| PM ₁₀ | No I. | | No I. | No I. | No I. | No I. | |
| | | | None | | | | |
| SO _x | No I. | | No I. | No I. | No I. | No I. | |
| | | | 200 5 (mg/m ³) (kg/h) | | | | |
| H ₂ SO ₄ | No I. | | No I. | No I. | No I. | No I. | |
| | | | 5 0.13 (mg/m ³) (kg/h) | | | | |

^{NL1} H₂SO₄ plant PVS (province NH)

4.2.5 Chemical installations for the production of titanium dioxide

| Air pollutant | A | B | DK | FIN | F ^{F9} HHAV | D | EL | IRL |
|------------------|-------|---|-------|-------|---|--|-------|-------|
| Particulates | No l. | | No l. | No l. | 50 | 50 ^{D1, D2, DAV} | No l. | No l. |
| | | | | | 50 (150) ⁹² (mg/m ³) | (mg/m ³) | | |
| PM ₁₀ | No l. | | No l. | No l. | None | None | No l. | No l. |
| SO _x | No l. | | No l. | No l. | 10 ⁹³ 500 ⁹⁴ (kg/t) (mg/m ³) | 10 ^{D1} 500 ^{D1, DAV} (kg/t) TiO ₂ (mg/m ³) | No l. | No l. |
| Cl ₂ | No l. | | No l. | No l. | None | 5 ^{D2, DAV} (mg/m ³) | No l. | No l. |

F⁹ Reference conditions: 273 k, 101.3 kPa

D¹ sulphate process

D² chloride process

⁹² 50 for the principal sources and 150 for the other sources (diffuse sources)

⁹³ For units of digestion and calcination

⁹⁴ for units of concentration and acid substances

| Air pollutant | I | L | NL | P | E | S | UK |
|------------------------|----------|----------|-----------|----------|----------|----------|-----------|
| Particulates | No I. | | No I. | No I. | No I. | No I. | |
| PM₁₀ | No I. | | No I. | No I. | No I. | No I. | |
| SO_x | No I. | | No I. | No I. | No I. | No I. | |
| Cl₂ | No I. | | No I. | No I. | No I. | No I. | |

4.2.6 Chlor-alkali manufacture processes

| Air pollutant | A | B | DK | FIN | F ^{F10 HHAV} | D | EL | IRL |
|------------------|-------|---|-------|-------|---|---|-------|-------|
| Particulates | No l. | | No l. | No l. | 100 ⁹⁵ 40 ⁹⁷ | 50 ^{HHAV} 20 | No l. | No l. |
| | | | | | (mg/m ³) | (mg/m ³) | | |
| PM ₁₀ | No l. | | No l. | No l. | None | None | No l. | No l. |
| Asbestos | No l. | | No l. | No l. | 0.1 ⁹⁸ (mg/m ³) | None ⁹⁹ 100 | No l. | No l. |
| Cl ₂ | No l. | | No l. | No l. | None | 1 ^{HHAV} 6 ^{101 HHAV} | No l. | No l. |
| | | | | | | 1 3 ¹⁰² (mg/m ³) | | |
| Mercury | No l. | | No l. | No l. | ¹⁰³ | None ¹⁰⁴ 105 | No l. | |

F¹⁰ Reference conditions: 273 k, 101.3 kPa

⁹⁵ for flows < 1 kg/h

⁹⁶ Values from national regulation.

⁹⁷ for flows > 1 kg/h

⁹⁸ Values from national regulation.

⁹⁹ new plants only on basis of membrane technology

¹⁰⁰ valid for the sum of class I carcinogenic compounds at a mass flow of 0.5 g/h or more; minimisation obligation

¹⁰¹ for total liquefaction

¹⁰² for total liquefaction

¹⁰³ the production of alkaline chlors that use a mercury cathode is forbidden for new installations

¹⁰⁴ new plants only on basis of membrane technology

¹⁰⁵ valid for the sum of class I carcinogenic compounds at a mass flow of 0.5 g/h or more; minimisation obligation

| Air pollutant | I | L | NL | P | E | S | UK |
|------------------------|----------|----------|-----------|----------|----------|----------|-----------|
| Particulates | No I. | | No I. | | No I. | No I. | |
| PM₁₀ | No I. | | No I. | | No I. | No I. | |
| Asbestos | No I. | | No I. | | No I. | No I. | |
| Cl₂ | No I. | | No I. | | No I. | No I. | |
| Mercury | No I. | | No I. | | No I. | No I. | |