

## Emission limit values: Comparative tables for cement industry, new or substantially changed installations in the EU

The present document contains comparative tables of emission limit values for cement industry in the EU. The sector considered is installations for production of cement clinker in rotary kilns with a production capacity exceeding 50 tonnes per day or in other furnaces with a production capacity exceeding 50 tonnes per day (Category 3.1 as defined in Annex I of the IPPC Directive). 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](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 for cement, 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.

### 3.1 Installations for the production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day

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 <sup>A1</sup> HHAV	B	DK <sup>DK1</sup>	FIN	F <sup>F1</sup>	D <sup>D1, D2</sup>	EL	IRL <sup>IRL3</sup>
Particulates	No l.		No l.	No l.	30 <sup>DAV</sup>	50 <sup>1 DAV</sup> HHAV	100 <sup>2</sup>	50 <sup>HHAV</sup> 30 <sup>DAV</sup>
	30 (mg/m <sup>3</sup> )		50 <sup>3 HAV</sup> (mg/Nm <sup>3</sup> )	10 (mg/m <sup>3</sup> )	None (mg/Nm <sup>3</sup> )	(mg/m <sup>3</sup> )	(mg/Nm <sup>3</sup> )	(mg/m <sup>3</sup> )
PM <sub>10</sub>	No l. (mg/m <sup>3</sup> )		No l.	No l.	None	None	None	None
CO	No l. (mg/m <sup>3</sup> )		No l.	No l.	None	None	<sup>2</sup>	1500 (mg/m <sup>3</sup> )
NO <sub>x</sub>	No l.		No l.	No l.	500	800 <sup>DAV</sup>	<sup>2</sup>	800 <sup>HHAV</sup> 400 <sup>DAV</sup>
	800; 1000 (mg/m <sup>3</sup> )		1250-3000 <sup>4 DAV</sup> (mg/Nm <sup>3</sup> )	None	None (mg/Nm <sup>3</sup> )	500 <sup>DAV</sup> HHAV (mg/m <sup>3</sup> )		(mg/m <sup>3</sup> )
SO <sub>x</sub>	No l.		No l.	No l.	320	400 <sup>DAV</sup>	<sup>5, 2</sup>	500 <sup>HHAV</sup> 400 <sup>DAV</sup>
	200 <sup>6</sup> (mg/m <sup>3</sup> )		10-500 <sup>7 DAV</sup> (mg/Nm <sup>3</sup> )	None	None (mg/Nm <sup>3</sup> )	350 <sup>DAV</sup> HHAV (mg/m <sup>3</sup> )		(mg/m <sup>3</sup> )
metals and their compounds (Hg, Cd, Tl, As, Co, Ni, Se, Te, Sb, Pb, Cr, Cu, Mn, V, Sn, Zn)	No l.		No l.	No l.	<sup>8, 9</sup>	<sup>HHAV</sup> 0,2 <sup>10</sup> 1 <sup>11</sup> 5 <sup>12</sup>	<sup>2</sup>	None

<sup>A1</sup> Reference conditions: 10% O<sub>2</sub>

<sup>DK1</sup> Reference conditions: 10% O<sub>2</sub>, units refer to dry air

<sup>F1</sup> Reference conditions: 0°C, 101.3 kPa, 11% O<sub>2</sub>

<sup>D1</sup> Reference conditions: 10% O<sub>2</sub>

<sup>D2</sup> in case of combustion together with waste mixed-ELVs are valid

<sup>IRL3</sup> 273K, 101.3 kPa, dry gas, 10% O<sub>2</sub>

<sup>1</sup> Using standard fuel

<sup>2</sup> the limit or guide value for each relevant pollutant and carbon monoxide in the exhaust gas resulting from coinceneration of hazardous waste must be calculated according to annex II of JMD 2487/455/99

<sup>3</sup> The limit value may vary dependent on semiwet or wet process for white and gray cement.

<sup>4</sup> The limit value may vary dependent on semiwet or wet process for white and gray cement.

<sup>5</sup> in cement works it is permitted to use fuels (standard fuels) with high sulphur content, provided the sulphur dioxide produced is absorbed in the product

<sup>6</sup> depending on the raw material exceeding up to 400 mg/m<sup>3</sup>

<sup>7</sup> The limit value may vary dependent on semiwet or wet process for white and gray cement.

each 8 Cd+Ti+Hg: 0.2mg: Nm<sup>3</sup>

As+Co+Ni+Se+Te: 1mg/Nm<sup>3</sup>

Sb+Cr+Cu+Sn+Mn+Pb+Va+Zn: 5mg/Nm<sup>3</sup>

<sup>9</sup> Every half year

<sup>10</sup> sum of Hg, Cd, Tl; using standard fuel; sum of vaporours, gaseous and particulate emissions

<sup>11</sup> sum of As, Co, Ni, Se, Te; using standard fuel; sum of vaporours, gaseous and particulate emissions

<sup>12</sup> sum of Sb, Pb, Cr, Cu, Mn, Pt, Pd, Rh, V, Sn; using standard fuel; sum of vaporours, gaseous and particulate emissions

Air pollutant	A <sup>13</sup> HHA <sup>14</sup> V	B	DK <sup>DK1</sup>	FIN	F <sup>15</sup>	D <sup>D1, D2</sup> HHA <sup>16</sup> V	EL	IRL <sup>IRL3</sup>
	0.2 <sup>13</sup> 1 <sup>14</sup> (mg/m <sup>3</sup> )		None	None	None	As, Cd 0.05 <sup>15</sup> Hg, Tl 0.05 <sup>16</sup> Co 0.05 <sup>17</sup> 0.5 <sup>18</sup> Ni 0.5 <sup>19</sup> Pb, Se, Te 0.5 <sup>20</sup> Cr 0.05 <sup>21</sup> 1 <sup>22</sup> Sb, Cu, Mn, V , Sn 1 <sup>23</sup> Zn None (mg/m <sup>3</sup> )		
PCDD/PCDF	No l. (ng/m <sup>3</sup> )		No l.	No l.	0.1 <sup>24</sup>	0.1 <sup>25</sup>	<sup>2</sup>	None
	0.1 <sup>26</sup> HHA <sup>27</sup> /DAV (ng/m <sup>3</sup> )		None	None	None	0.1 <sup>27</sup> (ngTE/m <sup>3</sup> )		

FOR DENMARK IT SEEMS AS IF THE ELV FOR NEW INSTALLATIONS (FROM THE REPORTING TOOL) CORRESPONDE TO THE ELV FOR EXISTING INSTALLATIONS OF THE OLD AGGREGATED TABLE AND VICE VERSA.

<sup>13</sup> sum of Cd, Tl, Be; each 0,1 mg/m<sup>3</sup> at most

<sup>14</sup> sum of As, Co, Ni, Pb

<sup>15</sup> minimisation obligation, sum of As, Cd and their compounds, benzo(a)pyrene, Cr-VI and water-soluble Co compounds (class I carcinogenic compounds); alternative ELV: 0.15 g/h

<sup>16</sup> valid for each class I metal; alternative ELV:0.25 g/h

<sup>17</sup> Co: limit value is depending on type of Co compounds:

\* carcinogenic Co compounds as sum of carcinogenic As, Cd and Cr-VI and their compounds, water soluble Co compounds, benzo(a)pyrene (class I carcinogenic compounds); alternative ELV: 0,15 g/h; minimisation obligation

\* Co and its compounds as sum of Co, Ni, Pb, Se, Te (class II particulate inorganic compounds)

<sup>18</sup> sum of Co, Ni, Pb, Se, Te (class II particulate inorganic compounds); alternative ELV:2.5 g/h; also valid for the sum of coinciding class I and II compounds, Ni: limit value is depending on type of Ni compounds:

\* carcinogenic Ni-compounds as sum of carcinogenic Ni and Ni compounds, acrylamide, acrylonitrile, dinitrotoluenes, ethylene oxide, 4-vinyl-1,2-cyclohexene-diepoxide (class II carcinogenic compounds); alternative ELV: 1,5 g/h; also valid for coinciding classes I and II; minimisation obligation

\* Ni and its compounds as sum of Co, Ni, Pb, Se, Te (class II particulate inorganic compounds)

<sup>19</sup> alternative ELV: 0.25 µg/h; minimisation obligation;

when using standard fuels, real emissions are far below, sum of Co, Ni, Pb, Se, Te (class II particulate inorganic compounds); alternative ELV:2.5 g/h; also valid for the sum of coinciding class I and II compounds

<sup>20</sup> sum of Co, Ni, Pb, Se, Te (class II particulate inorganic compounds); alternative ELV:2.5 g/h; also valid for the sum of coinciding class I and II compounds

<sup>21</sup> Cr: limit value is depending on type of Cr compounds:

\* as sum of carcinogenic As, Cd and Cr-VI and their ompounds and water soluble Co vompounds,

benzo(a)pyrene (class I carcinogenic compounds); alternative ELV: 0,15 g/h; minimisation obligation

\* Cr and its compounds as sum of Sb, Cr, CN ,F (fluoride), Cu, Mn, V, Sn (class III particulate inorganic compounds)

<sup>22</sup> sum of Sb, Cr, CN ,F (fluoride), Cu, Mn, V, Sn (class III particulate inorganic compounds); alternative ELV:5 g/h;

also valid for the sum of coinciding class I to III compounds, Cr: limit value is depending on type of Cr compounds:

\* as sum of carcinogenic As, Cd and Cr-VI and their ompounds and water soluble Co vompounds,

benzo(a)pyrene (class I carcinogenic compounds); alternative ELV: 0,15 g/h; minimisation obligation

\* Cr and its compounds as sum of Sb, Cr, CN ,F (fluoride), Cu, Mn, V, Sn (class III particulate inorganic compounds)

<sup>23</sup> sum of Sb, Cr, CN ,F (fluoride), Cu, Mn, V, Sn (class III particulate inorganic compounds); alternative ELV:5 g/h; also valid for the sum of coinciding class I to III compounds

<sup>24</sup> once per year

<sup>25</sup> target value (the real values are explicitly less than the target value)

<sup>26</sup> if waste is used as fuel

<sup>27</sup> alternative ELV: 0.25 µg/h; minimisation obligation;

when using standard fuels, real emissions are far below

Air pollutant	I	L	NL	P	E	S	UK
Particulates	No I.		No I.		30 <sup>E1 E2 28</sup> (mg/Nm <sup>3</sup> )	No I.	
PM <sub>10</sub>	No I.		No I.		None	No I.	
CO	No I.		No I.		None	No I.	
NO <sub>x</sub>	No I.		No I.		500 <sup>E1 E2</sup> 29 800 <sup>E1 E2</sup> 30 (mg/Nm <sup>3</sup> )	No I.	
SO <sub>x</sub>	No I.		No I.		600 <sup>E1 E2</sup> 31 (mg/Nm <sup>3</sup> )	No I.	
metals and their compounds (Hg, Cd, Tl, As, Co, Ni, Se, Te, Sb, Pb, Cr, Cu, Mn, V, Sn, Zn)	No I.		No I.		None	No I.	
PCDD/PCDF	No I.		No I.		None	No I.	

<sup>E1</sup> Reference conditions: normal conditions of pressure and temperature (101.3 kPa, 273°K) 10% O<sub>2</sub> normalised fuel gases

<sup>E2</sup> other ELVs can be authorized when waste valorization

<sup>28</sup> Cement Furnaces and coolers; other emission focus

<sup>29</sup> Cement Furnaces and coolers; data from dry furnaces

<sup>30</sup> other emission focus; other furnaces

<sup>31</sup> If it is not possible to get this value when raw sulphur materials are used, it must be noticed