

No. 435

Government Decree

**on the limitation of emissions of volatile organic
compounds due to the use of organic solvents in certain
activities and installations**

Issued in Helsinki, May 23, 2001

By decision of the Government, made on the submission of the Ministry of the Environment, the following is decreed on the basis of the Environmental Protection Act (86/2000) of February 4, 2000:

Section 1

Purpose and scope

The purpose of this Decree is to prevent environmental pollution by reducing the direct and indirect effects of emissions of volatile organic compounds to air. To achieve this, emissions of these compounds shall be limited to levels which do not exceed those laid down below.

This Decree shall apply to any activity using organic solvents where the amount of solvent consumed exceeds the amount specified for the respective activity in the tables of Annex 1. The Decree shall not apply to solvent-using activities in which the solvent undergoes a chemical change in the process in which it is used.

Section 2

Definitions

For the purposes of this Decree:

1) *installation* shall mean a stationary technical unit in which one or more of the activities specified in Annex 1 are carried out, and any other closely associated activities which have a technical connection with the activities carried out at that site and which could have an effect on emissions;

2) *existing installation* shall mean an installation in operation or an installation which has an operating permit obtained in accordance with the provisions existing prior to the date on which this Decree comes into effect or an installation whose environmental permit application was publicized prior to the date on which this Decree comes into effect and which will be in operation within one year of the date on which this Decree comes into effect;

3) *small installation* shall mean an installation which uses higher amounts of solvents than the lower amounts specified in Tables 1, 2, 5a, 5b, 5c, 11 and 12 of Annex 1, but without exceeding the higher amounts specified in the corresponding subparagraphs, or an installation which in any of the other activities of Annex 1 uses no more than 10 tonnes of solvents per year;

4) *substantial change*

a) for a small installation, shall mean a change in nominal capacity which produces an increase in emissions of volatile organic compounds of more than 25 per cent;

b) for other installations in which the consumption of organic solvents does not exceed 150 kilograms per hour or 200 tonnes per year, shall mean a change in nominal capacity which produces an increase in emissions of volatile organic compounds of more than 10 per cent;

c) shall mean any other change which may cause environmental pollution;

5) *waste gas* shall mean a gaseous discharge containing volatile organic compounds or other pollutants which is emitted to air via a stack or abatement equipment; the volumetric flow rate of the waste gas shall be expressed in units of cubic metres per hour at standard conditions (temperature 273.15 K, pressure 101.3 Pa);

6) *fugitive emissions* shall mean emissions released into the environment via windows, doors, vents and similar openings which are neither emissions in waste gases from the use of solvents nor organic solvents or organic compounds lost or recovered in waste gas treatment nor organic solvents or organic compounds lost or recovered in waste water treatment nor solvents contained in collected waste nor solvents recovered for reuse;

7) *total emissions* shall mean the combined total of fugitive emissions and emissions in waste gases;

8) *emission limit value* shall mean the calculated amount of volatile organic compounds emitted under standard conditions which may not be exceeded during one or more periods of time and which shall be expressed as a concentration, percentage or quantity of an emission;

9) *substances* shall mean chemical elements and their compounds in their naturally occurring state or in an industrially produced form;

10) *preparation* shall mean mixtures or solutions of two or more substances;

11) *volatile organic compound* shall mean an organic compound having a vapour pressure of at least 0.01 kPa at a temperature of 293.15 K or having an equivalent

volatility when used in certain conditions; the fraction of creosote which exceeds the vapour pressure value stated above at a temperature of 293.15 K shall also be considered a volatile organic compound;

12) *organic solvent* shall mean a solvent which is used alone or together with other substances to dissolve raw materials, products or waste materials, as a cleaning agent to dissolve contaminants, or as a dissolver, dispersion medium, viscosity adjuster, surface tension adjuster, plasticizer or preservative;

13) *halogenated organic solvent* shall mean an organic solvent which contains at least one atom of bromine, chlorine, fluorine or iodine per molecule;

14) *cleaning solvent* shall mean a solvent used for cleaning equipment;

15) *coating* shall mean a preparation containing organic solvents which is used to provide a decorative, protective or other functional effect on a surface;

16) *adhesive* shall mean a preparation containing organic solvents which is used to adhere together separate parts of a product;

17) *ink* shall mean a preparation containing organic solvents which is used in printing activities for printing text or images onto different surfaces;

18) *varnish* shall mean a transparent or other coating used for varnishing;

19) *consumption* shall mean the total input of organic solvents and cleaning solvents into an installation during one calendar year or other 12-month period, excluding organic solvents which are recovered for reuse;

20) *input* shall mean the amount of organic solvents and their amount contained in preparations used when carrying out each activity, including solvents recycled inside and outside the installation, and which are counted every time they are used;

21) *reuse of organic solvents* shall mean the use of organic solvents recovered from an installation for any technical or commercial purpose or as a fuel, but excluding the final disposal of such recovered solvent as waste;

22) *mass flow* shall mean the amount of volatile organic compounds emitted in units of mass per hour;

23) *nominal capacity* shall mean the maximum input of organic solvents into an installation, calculated as a daily average, where the installation operates at its design output under normal conditions, excluding start-ups, shut-downs and equipment maintenance;

24) *contained conditions* shall mean conditions under which volatile organic compounds released in an installation are collected in a controlled way and expelled to the outside air either untreated or via abatement equipment and which are thus not entirely fugitive emissions;

25) *24-hour average* shall mean the arithmetic mean of all valid readings obtained during 24 hours of normal operation;

26) *start-up and shut-down operations* shall mean all operations, except those related to regular fluctuations in production, which start up or shut down an activity, an equipment item or a storage tank, or which bring them to a start-up or shut-down state.

Section 3
Activities subject to a permit

In addition to what is laid down elsewhere on permit requirements, the following activities shall be subject to a permit under section 28, paragraph 1, of the Environmental Protection Act (86/2000):

- 1) activities specified in Annex 1:
 - a) printing activities as referred to in Table 1;
 - b) surface cleaning as referred to in Table 2;
 - c) coil coating as referred to in Table 4;
 - d) wood impregnation as referred to in Table 8;
 - e) manufacture of coatings, varnishes, inks and adhesives as referred to in Table 12;
 - f) rubber conversion as referred to in Table 13;
 - g) vegetable oil and animal fat extraction and vegetable oil refining as referred to in Table 14;
 - h) manufacturing of pharmaceutical products as referred to in Table 15;
- 2) activities specified in Annex 1 which consume more than 10 tonnes of organic solvents per year:
 - a) other surface cleaning as referred to in Table 2;
 - b) footwear manufacture as referred to in Table 9;
 - c) lamination as referred to in Table 10;

d) adhesive coating as referred to in Table 11;

3) activities specified in Annex 1 which consume more than 15 tonnes of organic solvents per year:

a) vehicle coating and refinishing as referred to in Table 3;

b) coating activities as referred to in Tables 5a, 5b, 5c and 5d;

c) winding wire coating as referred to in Table 6.

Section 4

Notification of activities for entry in the environmental protection database

The following activities shall be notified to a regional environment centre for entry in the environmental protection database in accordance with section 65, paragraph 1, of the Environmental Protection Act, unless the activity is one for which a permit should be obtained under section 28 of the Environmental Protection Act:

1) activities specified in Annex 1 which consume no more than 10 tonnes of organic solvents per year:

a) other surface cleaning as referred to in Table 2;

b) footwear manufacture as referred to Table 9;

c) lamination as referred to in Table 10;

d) adhesive coating as referred to in Table 11;

2) activities specified in Annex 1 which consume no more than 15 tonnes of organic solvents per year:

- a) vehicle coating and refinishing as referred to in Table 3;
- b) coating activities as referred to in Tables 5a and 5c;
- c) winding wire coating as referred to in Table 6.

Section 5

Permit exemption for dry cleaning

As an exception to section 1, paragraph 1, subparagraph 9, sub-subparagraph c, of the Environmental Protection Decree, no environmental permit shall be required for dry cleaning activities, provided that the activity uses equipment and systems intended for dry cleaning which do not produce any emissions to air or water and that the waste produced from the activity is submitted for treatment under section 15 of the Waste Act (1072/1993). This permit exemption does not, however, apply to any dry cleaning activity located in a groundwater area which is important or otherwise suitable for water supply and the operation of which may therefore create a risk of groundwater pollution.

The operator shall notify the regional environment centre of the dry cleaning activity for entry in the environmental protection database. If the activity does not fulfil the requirements laid down in paragraph 1 above, the supervisory authority shall order the operator to apply for an environmental permit within a fixed period. The requirements for dry cleaners are laid down in Table 7 of Annex 1.

Section 6

Emission limit values

In an installation with activities which are subject to a permit or are entered in the environmental protection database, the permitted emissions of volatile organic compounds derived from those activities may not exceed the values laid down in Annex 1 as milligrams of total organic carbon (mg C) per normal cubic metre (Nm³) in the case of emissions in waste gases to air and as a percentage (%) of the solvent input in the case of fugitive emissions, or, in the case of total emissions, as either emissions per unit of output or as a percentage of the solvent input.

The total emissions limit value may be used instead of the limit values for emissions in waste gases and fugitive emissions, provided that a total emissions limit value is given in addition to these in Annex 1.

An installation requiring a permit shall be exempt from the limit value for fugitive emissions specified in Annex 1 if compliance with the limit value for the activity is not technically or economically feasible. The operator shall demonstrate to the permit authority that the best available techniques are applied at the installation.

An installation requiring a permit which carries out the type of coating specified in Table 5a of Annex 1 shall be exempt from the limit value for emissions in waste gases and the limit value for fugitive emissions if the coating cannot be carried out in contained conditions. In this case, an emissions reduction scheme shall be followed. If the use of a reduction scheme is in no way technically or economically feasible, the operator shall demonstrate to the permit authority that the best available techniques are applied at the installation.

If an existing installation requiring a permit has emissions abatement equipment and operates within the emission limit values for volatile organic compounds in

waste gases of 50 mg C/Nm³ for incineration and 150 mg C/Nm³ when using other abatement equipment, the activities shall be exempt from the limit value for emissions in waste gases specified in Annex 1 for a period of 12 years after the date on which this Decree comes into effect. This shall require the operator to demonstrate to the permit authority that the installation's total emissions do not exceed the emissions that would occur if the installation were to comply with the limit value for emissions in waste gases and the limit value for fugitive emissions or the total emissions limit specified in Annex 1.

Section 7

Substantial change in an existing installation

If an activity at an installation falling within the scope of this Decree changes substantially or if a substantial change at an installation means that the Decree applies for the first time, the part of the installation affected by this substantial change shall be considered a new installation.

Section 8

Emissions reduction scheme

An operator may prepare an emissions reduction scheme for compliance within the installation in place of the limit values laid down in section 6 above. Under such a scheme the installation shall reduce its emissions by at least as much as it would if it were to comply with the limit values of section 6. The emissions reduction scheme may either take the form specified in Annex 2 or be an equivalent scheme in which emissions are reduced by about the same amount.

The target emission determined in the reduction scheme may be met in stages. A new installation's emissions

shall not exceed the target by more than a factor of 1.5 at the start of the activity and may be no higher than the target value as of October 31, 2004.

Emissions from an existing installation may not exceed the target value by more than a factor of 1.5 as of October 31, 2004, and may be no higher than the target value as of October 31, 2007. The permit authority may grant the installation extra time to achieve the target emission if the development of solvent-free or low-solvent products is still in progress.

The emissions reduction scheme shall be submitted when applying for an environmental permit for an activity requiring such a permit and, in the case of an installation making an entry in the environmental protection database, when giving notification of an activity for inclusion in the database.

The emission limit values laid down below in sections 9 and 10 shall be applied regardless of whether an emissions reduction scheme is used or not.

Section 9

Substitution and emission limit values of certain substances harmful to health

Substances and preparations which, on account of the volatile organic compounds they contain, are categorized as carcinogens, mutagens or toxic to reproduction and which are labelled with risk phrases R45, R46, R49, R60 and R61 shall be replaced by less hazardous substances or preparations at the first opportunity.

Emissions due to the use of substances with the labels referred to in paragraph 1 above shall not exceed 2 milligrams (mg) per normal cubic metre (Nm³) if the

combined mass flow of these compounds is 10 grams (g) per hour or more.

Section 10

Emission limit values of certain halogenated volatile organic compounds

Emissions due to the use of halogenated volatile organic compounds labelled with risk phrase R40 may not exceed 20 milligrams (mg) per normal cubic metre (Nm³) if the combined mass flow of these compounds is 100 grams (g) per hour or more.

Section 11

Application of emission limit values in installations carrying out more than one activity

In installations carrying out two or more of the activities specified in Annex 1, the emission limit values in the tables of Annex 1 can be applied to each activity separately.

Provided that the requirements of section 6, paragraph 1, are applied to each activity, the installation may also apply a total emissions limit, which shall not exceed the emissions level obtained by summation of the annual emissions of each activity.

An installation which carries out two or more of the activities specified in Annex 1 and which uses any of the substances stated in sections 9 and 10 above shall comply with the emission limit values laid down in sections 9 and 10 for each activity separately.

Section 12

National plan

A national plan may be drafted to reduce emissions of volatile organic compounds from existing installations. Such a plan may be drafted by a body or party representing an activity or activities falling within the scope of the Decree, or by a body or party appointed by it, which shall also submit a plan proposal to the Ministry of the Environment and function as liaison body in the matter.

A national plan shall cover all installations carrying out the activity or activities and it shall result in emissions reductions which are at least as great and within the same time period as the reductions that would be achieved by complying with the emission limit values and requirements laid down in sections 6 and 8. National plans shall not be drafted for dry cleaning activities or for surface cleaning with chlorinated solvents.

A national plan shall:

- 1) define the activity or activities covered by the plan;
- 2) state the number of installations covered by the plan, their total emissions, and, where applicable, the total emissions caused by each different activity;
- 3) specify the emissions reduction to be achieved;
- 4) clarify the actions to be undertaken to achieve the emissions reductions;
- 5) define binding interim targets for reducing emissions;
- 6) provide detailed clarification of how the execution of the national plan and the achievement of emissions reductions are to be monitored.

The national plan shall be submitted to the Ministry of the Environment no later than December 31, 2004. The producer of the plan shall submit a revised plan to the Ministry of the Environment every three years following the approval of the plan.

The Government shall prepare a decision on the basis of the plan. In the decision a national supervisory authority shall be appointed to which information concerning monitoring of the plan's implementation shall be supplied annually and which shall assess the progress made in reducing emissions and shall, where necessary, draft proposals for supplementing the plan.

The Ministry of the Environment shall supply the approved plan and its revisions as well as information concerning monitoring of the plan's implementation to the European Commission, which will carry out the actions stated in article 6 of the Council Directive on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations (1999/13/EC).

Even if an installation is covered by a national plan, it shall still comply with the emission limit values laid down in sections 9 and 10 above and apply for a permit under section 28 of the Environmental Protection Act, as applicable.

Section 13

Monitoring of emissions at installations requiring a permit

The environmental permit authority or, in situations referred to in section 46, paragraph 3, of the Environmental Protection Act, an authority assigned by it shall, when approving an installation's monitoring plan, specify the continuous or periodic measurements to be

taken and the monitoring details concerning emissions in waste gases at the installation.

If the installation's emission of volatile organic compounds at the final point of discharge beyond the abatement equipment on average exceeds 10 kilograms of total organic carbon per hour, the emissions in waste gases shall be monitored continuously.

Periodic measurements shall include at least three readings during each measurement period.

Section 14

Supply of information on and supervision of activities entered in the environmental protection database

Operators with activities entered in the environmental protection database shall submit information to the municipal environmental protection authority by the end of February each year on how the installation has complied with the provisions of this Decree. The report shall include information on the previous year which is essential to supervision, such as information on solvent input in the activity, compliance with emission limit values, emissions monitoring and information on the achievement of emissions reduction scheme targets.

For new installations, information on the first full year of operation shall be supplied, and for existing installations, the first information supplied shall be for the year 2006.

Section 15

Compliance with emission limit values

The operator shall demonstrate, in a manner approved by the permit authority, that the installation complies with the limit values for emissions in waste gases and the

limit values for fugitive emissions or the total emissions limit values or the emissions reduction scheme or other requirements of section 6, as applicable.

The solvent management plan described in Annex 3 may be used to assist in assessing compliance with emission limit values.

In the case of continuous measurements, the emission limit values shall be considered to be complied with if:

- a) no 24-hour average value exceeds the emission limit values during normal operation; and
- b) no hourly average exceeds the emission limit values by more than a factor of 1.5.

In periodic measurements, the emission limit values shall be considered to be complied with if, in one monitoring exercise:

- a) the average of all readings does not exceed the emission limit values; and
- b) no hourly average exceeds the emission limit values by more than a factor of 1.5.

Compliance with the limit values for emissions in waste gases specified in Annex 1 shall be verified on the basis of total carbon, unless otherwise stipulated in Annex 1. Compliance with the emission limit values specified in sections 9 and 10 above shall be verified on the basis of the sum of the masses of individual volatile organic compounds.

This Decree shall enter into force on June 4, 2001. Section 6, paragraphs 1-3, and sections 7-15 of the Decree shall not, however, apply to existing installations until October 31, 2007.

Operators shall submit notification of the existing activities referred to in section 4 for entry in the environmental protection database no later than December 31, 2004.

Notification of an existing activity referred to in section 5 above for entry in the environmental protection database should be made no later than June 30, 2004. For these activities, any deadline that may need to be imposed on applying for an environmental permit shall not be set later than December 31, 2004.

Helsinki, May 23, 2001

Minister of the Environment *Satu Hassi*

Senior Advisor *Anneli Karjalainen*

EMISSIONS REDUCTION SCHEME

An installation may apply an emissions reduction scheme in place of the limit values for emissions in waste gases and fugitive emissions or the total emissions limit values specified in Annex 1. Under such a scheme the installation shall reduce its emissions by at least as much as it would if it were to comply with the limit values of Annex 1.

The operator shall submit the emissions reduction scheme to the permit or supervisory authority in accordance with section 8, paragraph 4, of the Decree.

An emissions reduction scheme may be drafted for any installation which uses coatings, varnishes, inks or adhesives. The main aim is to reduce the average solvent content of products used at the installation and/or to increase the installation's efficiency in the use of solids to achieve a reduction in its total emissions to a given percentage of the annual reference emissions, termed the target emission. The target emission shall be achieved within the timetable laid down in section 8 of the Decree.

Annual reference emission:

The annual reference emission shall be calculated to correspond as closely as possible to the emissions that would have resulted had no reduction action been taken at the installation or to the situation prevailing when the reduction scheme is prepared.

The annual reference emission shall be calculated as follows:

1) The total mass of solids contained in the coating, ink, varnish or adhesive consumed in a year is first determined. For these purposes solids are all materials in coatings, inks, varnishes or adhesives that become solid once the water or volatile organic compounds are evaporated.

2) The reference emission is then calculated by multiplying the total mass of solids determined in subparagraph 1 by the appropriate factor given in Table 2.1. The factors in the table are constants which describe the typical ratio of the mass of solvents to solids for the products used in each activity in cases where traditional solvent-based products are used. If it can be clearly proved to the permit authority or, in the case of an installation required to provide notification for entry in the environmental protection database, to the supervisory authority, that the factor representing the ratio of the mass of solvents to solids for the product used in the activity is something other than the constant given below, this may be used in the reference emission calculation.

Table 2.1

Field of application

Factor

Rotogravure, flexography, lamination as part of a printing activity, varnishing as part of a printing activity

Coating of wooden surfaces

Coating of textiles, fabric, film or paper

Adhesive coating

Coil coating

Vehicle refinishing

Food contact coatings

Aviation and space industry coatings

Other coating

Rotary screen printing

Target emission:

3) The target emission is equal to the annual reference emission multiplied by a percentage equal to

(limit value for fugitive emissions given in Annex 1 + 15), for installations which fall within the scope of refinishing under Annex 1 (Table 3) or exceed the lower solvent consumption levels of the subparagraphs of Annex 1 dealing with other coating (Table 5a) and coating of wooden surfaces (Table 5b);

(limit value for fugitive emissions given in Annex 1 + 5), for all other installations.

4) The Decree's requirements are considered to be complied with when the actual annual emission determined with the aid of the solvent management plan under Annex 3 or otherwise in a manner approved by the permit authority or, in the case of an installation required to provide notification for entry in the environmental protection database, by the supervisory authority, is less than or equal to the target emission.

SOLVENT MANAGEMENT PLAN

A solvent management plan may be used to verify compliance with the emission limit values of Annex 1 in a manner approved by the permit authority, to plan emissions reduction measures and to estimate solvent consumption, solvent emissions and compliance with other regulations at the installation.

Amount of organic solvents entering the process, i.e. input of organic solvents (I):

$$I = I1 + I2$$

I1. The amount of organic solvents or their amount in preparations used in the activity in the period over which the mass balance is calculated.

I2. The amount of recovered organic solvents or their amount in preparations recovered and reused as solvent in the activity. The recycled solvent is counted every time it is used in the activity.

Amount of organic solvents emitted from the process or activity, i.e. output of organic solvents (O):

01. Emissions in waste gases

02. Organic solvents dissolved in water

03. Amount of organic solvents which remain as contamination or residue in products manufactured in the process.

04. Uncaptured emissions of organic solvents to air. This includes emissions of organic solvents via general

ventilation, where air is released through doors, windows, vents and other similar openings.

05. Organic solvents or organic compounds lost due to chemical or physical reactions, e.g. by incineration or other waste gas treatment, or recovered by adsorption, or organic solvents or organic compounds lost or recovered in waste-water treatment, provided that they are not counted under 06, 07 or 08.

06. Organic solvents contained in collected waste.

07. Organic solvents, or organic solvents contained in preparations, which are sold as products with a commercial value.

08. Organic solvents contained in preparations, but not those counted in 07, which are recovered for reuse elsewhere than in the process.

09. Organic solvents emitted in any other way.

Use of a solvent management plan in determining fugitive emissions (F)

In calculating fugitive emissions (F), the following equations may be used:

$$F = I1 - O1 - O5 - O6 - O7 - O8$$

or

$$F = O2 + O3 + O4 + O9$$

The limit value for fugitive emissions is expressed/calculated as a percentage (%) of the solvent input in the process (I).

Use of a solvent management plan in complying with an emissions reduction scheme under Annex 2

If the installation is applying an emissions reduction scheme, the annual solvent consumption (C) may be determined using the solvent management plan as follows:

$$C = I1 - O8$$

The annual consumption may also be used to determine the content of solids in coatings, inks, varnishes or adhesives for calculation of the annual reference emissions and target emissions on the basis of the dry-matter content (% or g/l) and the dry-matter density (g/l) of the product used.

Use of a solvent management plan in calculating total emissions (E)

To determine the total emissions (E) of the installation or operating unit, a solvent management plan should be drawn up annually. Total emissions may be calculated as follows:

$$E = F \text{ (fugitive emissions)} + O1 \text{ (emissions in waste gases)}$$

In an installation which carries out two or more activities falling within the scope of the Decree or which applies a total emissions limit referred to in section 11, paragraph 2, of the Decree, a solvent management plan should be drawn up annually to allow calculation of the total emissions caused by all relevant activities and to allow the emissions to be compared with those total emissions that would be achieved by complying with the emission limit values specified in Annex 1 for each activity separately.