

Technical Annex prepared by EGTEI

## **Suggested Technical Annex VI**

### **to the Gothenburg Protocol**

**The technical annexes have been delivered to WGS&R 44, as first release, in electronic and printed form, with the purpose of receiving preliminary comments and further guidance from the Parties, in view of the official submission of these annexes, along with the guidance documents, to WGS&R 45, September 2009.**

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## Annex VI

### LIMIT VALUES FOR EMISSIONS OF VOLATILE ORGANIC COMPOUNDS FROM STATIONARY SOURCES

[Existing and new installations have to be defined]

1. Section A applies to Parties other than Canada and the United States of America, section B applies to Canada and section C applies to the United States of America.

#### A. Parties other than Canada and the United States of America

2. This section of the present annex covers the stationary sources of non-methane volatile organic compound (NMVOC) emissions listed in paragraphs 8 to 21 below. Installations or parts of installations for research, development and testing of new products and processes are not covered. Threshold values are given in the sector-specific tables below. They generally refer to solvent consumption or emission mass flow. Where one operator carries out several activities falling under the same subheading at the same installation on the same site, the solvent consumption or emission mass flow of such activities are added together. If no threshold value is indicated, the given limit value applies to all the installations concerned.

3. For the purpose of section A of the present annex:

(a) "Storage and distribution of petrol" means the loading of trucks, railway wagons, barges and seagoing ships at depots and mineral oil refinery dispatch stations, excluding vehicle refuelling at service stations covered by relevant documents on mobile sources;

(b) "Adhesive coating" means any process in which an adhesive is applied to a surface, with the exception of adhesive coating and laminating associated with printing processes and wood and plastic lamination;

(c) "Wood and plastic lamination" means any process to adhere together wood and/or plastic to produce laminated products;

(d) "Coating processes" means the application of metal and plastic surfaces to: passenger cars, truck cabins, trucks, buses or wooden surfaces and covers any process in which a single or multiple application of a continuous film of coating is laid onto:

- (i) New vehicles defined (see below) as vehicles of category M1 and of category N1 insofar as they are coated at the same installation as M1 vehicles;
- (ii) Truck cabins, defined as the housing for the driver, and all integrated housing for the technical equipment of category N2 and N3 vehicles;
- (iii) Vans and trucks defined as category N1, N2 and N3 vehicles, but excluding truck cabins;
- (iv) Buses defined as category M2 and M3 vehicles; and
- (v) Other metallic and plastic surfaces including those of aeroplanes, ships, trains, etc., wooden surfaces, textile, fabric, film and paper surfaces.

This source category does not include the coating of substrates with metals by electrophoretic or chemical spraying techniques. If the coating process includes a step in which the same article is printed, that printing step is considered part of the coating process. However, printing processes operated as a separate activity are not included. In this definition:

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- M1 vehicles are those used for the carriage of passengers and comprising not more than eight seats in addition to the driver's seat;
- M2 vehicles are those used for the carriage of passengers and comprising more than eight seats in addition to the driver's seat, and having a maximum mass not exceeding 5 Mg;
- M3 vehicles are those used for the carriage of passengers and comprising more than eight seats in addition to the driver's seat, and having a maximum mass exceeding 5 Mg;
- N1 vehicles are those used for the carriage of goods and having a maximum mass not exceeding 3.5 Mg;
- N2 vehicles are those used for the carriage of goods and having a maximum mass exceeding 3.5 Mg but not exceeding 12 Mg;
- N3 vehicles are those used for the carriage of goods and having a maximum mass exceeding 12 Mg.

(e) "Coil coating" means any processes where coiled steel, stainless steel, coated steel, copper alloys or aluminium strip is coated with either a film-forming or laminate coating in a continuous process;

(f) "Dry cleaning" means any industrial or commercial process using VOCs in an installation to clean garments, furnishings and similar consumer goods with the exception of the manual removal of stains and spots in the textile and clothing industry;

(g) "Manufacturing of coatings, varnishes, inks and adhesives" means the manufacture of coating preparations, varnishes, inks and adhesives, and of intermediates as far as they are produced in the same installation by mixing pigments, resins and adhesive materials with organic solvents or other carriers. This category also includes dispersion, predispersion, realization of a certain viscosity or colour and packing the final products in containers;

(h) "Printing" means any process of reproduction of text and/or images in which, with the use of an image carrier, ink is transferred onto a surface and applies to the following subprocesses:

- (i) Flexography: a printing process using an image carrier of rubber or elastic photopolymers on which the printing inks are above the non-printing areas, using liquid inks that dry through evaporation;
- (ii) Heat set web offset: a web-fed printing process using an image carrier in which the printing and non-printing areas are in the same plane, where web-fed means that the material to be printed is fed to the machine from a reel as distinct from separate sheets. The non-printing area is treated to attract water and thus reject ink. The printing area is treated to receive and transmit ink to the surface to be printed. Evaporation takes place in an oven where hot air is used to heat the printed material;
- (iii) Publication rotogravure: rotogravure used for printing paper for magazines, brochures, catalogues or similar products, using toluene-based inks;
- (iv) Rotogravure: a printing process using a cylindrical image carrier in which the printing area is below the non-printing area, using liquid inks that dry through evaporation. The recesses are filled with ink and the surplus is cleaned off the non-printing area before the surface to be printed contacts the cylinder and lifts the ink from the recesses;
- (v) Rotary screen printing: a web-fed printing process in which the ink is passed onto the surface to be printed by forcing it through a porous image carrier, in which the printing area is open and the non-printing area is sealed off, using liquid inks that dry only through evaporation. Web-fed means that the material to be printed is fed to the machine from a reel as distinct from separate sheets;
- (vi) Laminating associated to a printing process: the adhering of two or more flexible materials to produce laminates; and

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(vii) Varnishing: a process by which a varnish or an adhesive coating is applied to a flexible material for the purpose of later sealing the packaging material;

(i) "Manufacturing of pharmaceutical products" means chemical synthesis, fermentation, extraction, formulation and finishing of pharmaceutical products and, where carried out at the same site, the manufacture of intermediate products;

(j) "Conversion of natural or synthetic rubber" means any process of mixing, crushing, blending, calendering, extruding and vulcanization of natural or synthetic rubber and additionally processes for the processing of natural or synthetic rubber to derive an end product;

(k) "Surface cleaning" means any process except dry cleaning using organic solvents to remove contamination from the surface of material, including degreasing; a cleaning process consisting of more than one step before or after any other processing step is considered as one surface-cleaning process. The process refers to the cleaning of the surface of products and not to the cleaning of process equipment;

(l) "Extraction of vegetable oil and animal fat and refining of vegetable oil" means the extraction of vegetable oil from seeds and other vegetable matter, the processing of dry residues to produce animal feed, and the purification of fats and vegetable oils derived from seeds, vegetable matter and/or animal matter;

(m) "Vehicle refinishing" means any industrial or commercial coating activity and associated degreasing activities performing:

~~(i) The coating of road vehicles, or part of them, carried out as part of vehicle repair, conservation or decoration outside manufacturing installations, or~~

(ii) The original coating of road vehicles, or part of them, with refinishing-type materials, where this is carried out away from the original manufacturing line, or

(iii) The coating of trailers (including semi-trailers);

**These activities are studied together with the coating of cars.**

**Vehicle refinishing, defined as the coating of road vehicles, or part of them, carried out as part of vehicle repair, conservation or decoration outside manufacturing installations, is considered in Annex XI.**

(n) "Impregnation of wooden surfaces" means any process impregnating timber with preservative;

**(o) "Winding wire coating" means any coating activity of metallic conductors used for winding the coils in transformers and motors, etc;**

~~(p)~~ "Standard conditions" means a temperature of 273.15 K and a pressure of 101.3 kPa;

~~(q)~~ "NMVOCs" comprise all organic compounds except methane which at **293.15** ~~273.15~~ K show a vapour pressure of at least 0.01 kPa or which show a comparable volatility under the given application conditions;

**(r) "Organic solvent" means any VOC which is used alone or in combination with other agents, and without undergoing a chemical change, to dissolve raw material, products or waste materials, or is used as a cleaning agent to dissolve contaminants, or as a dissolver, or as a dispersion medium, or as a viscosity adjuster, or as a surface tension adjuster, or a plasticizer, or as a preservative;**

~~(s)~~ "Waste gas" means the final gaseous discharge containing NMVOCs or other pollutants from a stack or from emission abatement equipment into air. The volumetric flow rates shall be expressed in m<sup>3</sup>/h at standard conditions;

~~(t)~~ "Fugitive emission of NMVOCs" means any emission, not in waste gases, of NMVOC into air, soil and water as well as, unless otherwise stated, solvents contained in any product and includes uncaptured emissions of NMVOCs released to the outside environment via windows, doors, vents and similar openings. Fugitive limit values are calculated on the basis of a solvent management plan (see appendix I to the present annex);

~~(u)~~ "Total emission of NMVOCs" means the sum of fugitive emission of NMVOCs and emission of NMVOCs in waste gases;

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(v#) "Input" means the quantity of organic solvents and their quantity in preparations used when carrying out a process, including the solvents recycled inside and outside the installation, and which are counted every time they are used to carry out the activity;

(w#) "Limit value" means the maximum quantity of a gaseous substance contained in the waste gases from an installation which is not to be exceeded during normal operation. Unless otherwise specified, it shall be calculated in terms of mass of pollutant per volume of the waste gases (expressed as mg C/Nm<sup>3</sup> unless specified otherwise), assuming standard conditions for temperature and pressure for dry gas. For solvent-using installations, limit values are given as mass unit per characteristic unit of the respective activity. Gas volumes that are added to the waste gas for cooling or dilution purposes shall not be considered when determining the mass concentration of the pollutant in the waste gas. Limit values generally address all volatile organic compounds except methane (no further distinction is made, e.g. in terms of reactivity or toxicity);

(x#) "Normal operation" means all periods of operation except start-up and shutdown operations and maintenance of equipment;

(y#) "Substances harmful to human health" are subdivided into two categories:

- (i) Halogenated VOCs that have possible risk of irreversible effects; or
- (ii) Hazardous substances that are carcinogens, mutagens or toxic to reproduction or that may cause cancer, may cause heritable genetic damage, may cause cancer by inhalation, may impair fertility or may cause harm to the unborn child.

4. The following requirements shall be satisfied:

(a) Emissions of NMVOCs shall be monitored 1/ and compliance with limit values shall be verified. The methods of verification may include continuous or discontinuous measurements, type approval, or any other technically sound method; furthermore, they shall be economically viable;

(b) The concentrations of air pollutants in gas-carrying ducts shall be measured in a representative way. Sampling and analysis of relevant polluting substances and measurements of process parameters, as well as the quality assurance of automated systems and the reference measurement methods to calibrate those systems all pollutants, as well as reference measurement methods to calibrate any measurement system, shall be carried out in accordance with CEN standards. If CEN standards are not available, ISO standards, national or international standards which will ensure the provision of data of an equivalent scientific quality shall apply, according to the standards laid down by the European Committee for Standardization (CEN) or by the International Organization for Standardization (ISO). While awaiting the development of CEN or ISO standards, national standards shall apply;

(c) If measurements of emissions of NMVOCs are required, they should be carried out continuously if emissions of NMVOCs exceed 10 kg of total organic carbon (TOC)/h in the exhaust duct downstream from an emission reduction installation and the hours of operation exceed 200 hours a year. For all other installations, discontinuous measurement is required as a minimum. For the approval of compliance, own approaches may be used provided that they result in equal stringency;<sup>1</sup>

(d) In the case of continuous measurements, as a minimum requirement, compliance with the emission standards is achieved if the daily mean does not exceed the limit value during normal operation and no hourly average exceeds the limit values by 150%. For the approval of compliance, own approaches may be used provided that they result in equal stringency;

(e) In the case of discontinuous measurements, as a minimum requirement, compliance with the emission standards is achieved if the mean value of all readings does not exceed the limit value and no hourly mean exceeds the limit value by 150%. For the approval of compliance, own approaches may be used provided that they result in equal stringency;

(f) All appropriate precautions shall be taken to minimize emissions of NMVOCs during start-up and shutdown, and in case of deviations from normal operation; and

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<sup>1</sup> Former paragraphs c, d, e f, g on monitoring were deleted to let maximum flexibility to the Parties.

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(g) Measurements are not required if end-of-pipe abatement equipment is not needed to comply with the limit values below and it can be shown that limit values are not exceeded.

5. The following limit values should be applied for waste gases, unless stated otherwise below:

(a) 20 mg substance/Nm<sup>3</sup> for discharges of halogenated volatile organic compounds (which are assigned the risk phrase: possible risk of irreversible effects), where the mass flow of the sum of the considered compounds is greater than or equal to 100 g/h; and

(b) 2 mg/Nm<sup>3</sup> (expressed as the mass sum of individual compounds) for discharges of volatile organic compounds (which are assigned the following risk phrases: may cause cancer, heritable genetic damage, cancer by inhalation or harm to the unborn child; may impair fertility), where the mass flow of the sum of the considered compounds is greater than or equal to 10 g/h.

6. For the source categories listed in paragraphs 9 to 21 below, the following revisions are relevant:

(a) Instead of applying the limit values for installations set out below, the operators of the respective installations may be allowed to use a reduction scheme (see appendix II to the present annex). The purpose of a reduction scheme is to give the operator the possibility to achieve by other means emission reductions equivalent to those achieved if given limit values were to be applied; and

(b) For fugitive emissions of NMVOCs, the fugitive emission values set out below shall be applied as a limit value. However, where it is demonstrated to the satisfaction of the competent authority that for an individual installation this value is not technically and economically feasible, the competent authority may exempt that installation provided that significant risks to human health or the environment are not expected. For each derogation, the operator must demonstrate to the satisfaction of the competent authority that the best available technique is used.

7. The limit values for VOC emissions for the source categories defined in paragraph 3 shall be as specified in paragraphs 8 to 21 below.

8. Storage and distribution of petrol:

**Table 1. Suggested options for Limit values for VOC emissions released from the storage and distribution of petrol, excluding the loading of seagoing ships**

Capacity, technique, further specification	Threshold values	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>
		Option3 <sup>1/</sup> Limit-value
Vapour recovery unit serving storage and distribution facilities at refinery tank farms or terminals	5000 m <sup>3</sup> petrol throughput annually Existing terminals or tank farms with a throughput of 10000 t/year New terminals without thresholds	10 g VOC/Nm <sup>3</sup> including methane [0.005 % w/w]
Capacity, technique, further specification	Vapour/petrol ratio for Stage II petrol vapour recovery systems where the recovered petrol vapour is transferred to an underground storage tank at the service station	Minimum vapour recovery efficiency % w/w
Service station	Vapour/petrol ratio shall be equal to or greater than 0,95 but less than or equal to 1,05	Hydrocarbon capture efficiency of a Stage II petrol vapour recovery system is

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	<p>New service station if its actual or intended throughput is greater than 500 m<sup>3</sup> per annum</p> <p>Existing service station if its actual or intended throughput is greater than 3,000 m<sup>3</sup> per annum</p> <p>Existing service station if its actual or intended throughput is greater than 500 m<sup>3</sup> per annum and which undergoes a major refurbishment</p>	<p>equal to or greater than [85% w/w]</p>
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**Note:** The vapour displaced by the filling of petrol storage tanks shall be displaced either into other storage tanks or into abatement equipment meeting the limit values in the table above.

9. Adhesive coating:

ELV3 correspond to ELVs defined in the Solvent Directive 99/13/EC.

**Table 2: Suggested options for limit values for adhesive coating**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>		
	Option1 <sup>1/</sup>	Option2 <sup>1/</sup>	Option3 <sup>1/</sup>
Shoe industry (solvent consumption > 5 t/y)	-	-	[25 <sup>a/</sup> g VOC / pair of shoes]
Other adhesive coating, except footwear; new and existing installations (solvent consumption > 15 t/y)	[ELVc = 50mg <sup>b/</sup> C/Nm <sup>3</sup> ELVd = 10 wt-% or less of the solvent input Or total ELV of 0.6 kg or less of VOC/kg of solid input]	[ELVc = 50mg <sup>b/</sup> C/Nm <sup>3</sup> ELVd = 15 wt-% or less of the solvent input Or total ELV of 0.8 kg or less of VOC/kg of solid input]	[ELVc = 50mg <sup>b/</sup> C/Nm <sup>3</sup> ELVd = 20 wt-% or less of the solvent input Or total ELV of 1 kg or less of VOC/kg of solid input]
Other adhesive coating, except footwear; new and existing installations (solvent consumption 5 - 15 t/y)	-	-	[ELVc = 50mg C/Nm <sup>3</sup> ELVd = 25 wt-% or less of the solvent input Or total ELV of 1.2 kg or less of VOC/kg of solid input]

a/ Total emission limit values are expressed in grams of solvent emitted per pair of complete footwear produced.

b/ If techniques are used which allow reuse of recovered solvent, the limit value shall be 150 mg C/Nm<sup>3</sup>.

10. Wood and plastic lamination:

**Table 3: Suggested options for VOC emission ELV for wood and plastic lamination**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>
	Option 3 <sup>1/</sup>

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Wood and plastic laminating; new and existing installations (solvent consumption > 5 t/y)	[Total ELV of 30 g VOC/m <sup>2</sup> ]
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**Table 2. Limit values for NMVOC emissions released from adhesive coating**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year)	Limit value	Limit value for fugitive emissions of NMVOCs (% of solvent input)
Footwear manufacture; new and existing installations	> 5	-25 g solvent per pair	-
Other adhesive coating, except footwear; new and existing installations	5-15	50 <sup>a/</sup> mg C/Nm <sup>3</sup>	25
	>15	50 <sup>a/</sup> mg C/Nm <sup>3</sup>	20

a/ If techniques are used which allow reuse of recovered solvent, the limit value shall be 150 mg C/Nm<sup>3</sup>.

10. Wood and plastic lamination:

**Table 3. Limit values for NMVOC emissions released from wood and plastic lamination**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year)	Limit value for total emissions of NMVOCs
Wood and plastic laminating; new and existing installations	> 5	30 g NMVOC/m <sup>2</sup>

11. Coating processes (vehicle coating industry):

**Table 4: Suggested options limit values for coating processes in the vehicle industry**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>		
	Option1 <sup>a/ 1/</sup>	Option2 <sup>a/ 1/</sup>	Option3 <sup>a/ 1/</sup>
Manufacture of cars (M1, M2) (solvent consumption > 15 tonnes/y and ≤ 5,000 coated items/y or > 3 500 chassis-built)	[-]	[-]	[90 g VOC/m <sup>2</sup> or 1.5 kg/body + 70 g/m <sup>2</sup> ]
Manufacture of cars (M1, M2) (solvent consumption > 15 tonnes/y and >	[25 g VOC/m <sup>2</sup> or 0.7 kg/body + 17 g/m <sup>2</sup> ]	[35 g VOC/m <sup>2</sup> or 1 kg/body + 26 g/m <sup>2</sup> ]	[Existing installations: 60 g VOC/m <sup>2</sup> or 1.9 kg/body + 41 g/m <sup>2</sup> ]
			[New installations: 45 g



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5,000 coated items/y)			VOC/m <sup>2</sup> or 1.3 kg/body + 33 g/m <sup>2</sup>
Manufacture of truck cabins (N1, N2, N3) (solvent consumption > 15 tonnes/y and ≤ 5,000 coated items/y)	[-]	[-]	[Existing installations: 85 g VOC/m <sup>2</sup> [New installations: 65 g VOC/m <sup>2</sup>
Manufacture of truck cabins (N1, N2, N3) (solvent consumption > 15 tonnes/y and > 5,000 coated items/y)	[35 g VOC/m <sup>2</sup>	[55 g VOC/m <sup>2</sup>	[Existing installations: 75 g VOC/m <sup>2</sup> [New installations: 55 g VOC/m <sup>2</sup>
Manufacture of trucks and vans (solvent consumption > 15 tonnes/y and ≤ 2,500 coated items/y)	[-]	[-]	[Existing installations: 120 g VOC/m <sup>2</sup> [New installations: 90 g VOC/m <sup>2</sup>
Manufacture of trucks and vans (solvent consumption > 15 tonnes/y and > 2,500 coated items/y)	[35 g VOC/m <sup>2</sup>	[50 g VOC/m <sup>2</sup>	[Existing installations: 90 g VOC/m <sup>2</sup> [New installations: 70 g VOC/m <sup>2</sup>
Manufacture of buses (solvent consumption > 15 tonnes/y and ≤ 2,000 coated items/y)	[-]	[-]	[Existing installations: 290 g VOC/m <sup>2</sup> New installations: 210 g VOC/m <sup>2</sup>
Manufacture of buses (solvent consumption > 15 tonnes/y and > 2,000 coated items/y)	[120 g VOC/m <sup>2</sup>	[150 g VOC/m <sup>2</sup>	[Existing installations: 225 g VOC/m <sup>2</sup> [New installations: 150 g VOC/m <sup>2</sup>

a/ The total limit values are expressed in terms of mass of solvent (g) emitted in relation to the surface area of product (m<sup>2</sup>). The surface area of the product is defined as the surface area calculated from the total electrophoretic coating area and the surface area of any parts that might be added in successive phases of the coating process which are coated with the same coatings. The surface of the electrophoretic coating area is calculated using the formula: (2 x total weight of product shell)/(average thickness of metal sheet x density of metal sheet). The total ELVs defined in the table above refer to all process stages carried out at the same installation from electrophoretic coating, or any other kind of coating process through the final wax and polish of topcoating inclusive, as well as solvent used in cleaning of process equipment, including spray booths and other fixed equipment, both during and outside of production time.

## 12. Coating processes (metal, plastic, textile, fabric, film, plastic, leather and wooden surfaces coating):

**Table 5: Suggested options limit values for coating processes in various industrial sectors**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>		
	Option1 <sup>1/</sup>	Option2 <sup>1/</sup>	Option3 <sup>1/</sup>
New and existing installations:	[-]	[-]	[ELVc = 100 <sup>a/</sup> mg C/Nm <sup>3</sup>

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<p>wood coating (solvent consumption 15 - 25 tonnes/y)</p>			<p>ELVd = 25 wt-% or less of the solvent input <b>Or</b> total ELV of 1.6 kg or less of VOC / kg of solid input]</p>
<p>New and existing installations: wood coating (solvent consumption &gt; 25 tonnes/y)</p>	<p>[ELVc = 50 mg C/Nm<sup>3</sup> for drying and 75 mg C/Nm<sup>3</sup> for coating ELVd = 10 wt-% or less of the solvent input <b>Or</b> total ELV of 0.50 kg or less of VOC / kg of solid input]</p>	<p>[ELVc = 50 mg C/Nm<sup>3</sup> for drying and 75 mg C/Nm<sup>3</sup> for coating ELVd = 15 wt-% or less of the solvent input <b>Or</b> total ELV of 0.75 kg or less of VOC / kg of solid input]</p>	<p>[ELVc = 50 mg C/Nm<sup>3</sup> for drying and 75 mg C/Nm<sup>3</sup> for coating ELVd = 20 wt-% or less of the solvent input <b>Or</b> total ELV of 1 kg or less of VOC / kg of solid input]</p>
<p>New and existing installations: other coating, incl. metal, plastics, textile, fabric, foil and paper (excl. web screen printing for textiles, see printing) (solvent consumption 5 - 15 tonnes/y)</p>	<p style="text-align: center;">[-]</p>	<p style="text-align: center;">[-]</p>	<p>[ELVc = 100<sup>a/ b/</sup> mg C/Nm<sup>3</sup> ELVd = 20<sup>b/</sup> wt-% or less of the solvent input <b>Or</b> total ELV of 0.525 kg or less of VOC / kg of solid input]</p>
<p>New and existing installations: textile, fabric, foil and paper coating, incl. (excl. web screen printing for textiles, see printing) (solvent consumption &gt; 15 tonnes/y)</p>	<p style="text-align: center;">[-]</p>	<p style="text-align: center;">[-]</p>	<p>[ELVc = 50 mg C/Nm<sup>3</sup> for drying and 75 mg C/Nm<sup>3</sup> for coating<sup>b/ a/</sup> ELVd = 20<sup>b/</sup> wt-% or less of the solvent input <b>Or</b> total ELV of 0.375 kg or less of VOC / kg of solid input]</p>
<p>New and existing installations: coating of plastic workpieces (solvent consumption &gt; 15 tonnes/y)</p>	<p>[ELVc = 50 mg C/Nm<sup>3</sup> for drying and 75 mg C/Nm<sup>3</sup> for coating<sup>b/</sup> ELVd = 10<sup>b/</sup> wt-% or less of the solvent input <b>Or</b> total ELV of 0.30 kg or less of VOC / kg of solid input]</p>	<p>[ELVc = 50 mg C/Nm<sup>3</sup> for drying and 75 mg C/Nm<sup>3</sup> for coating<sup>b/</sup> ELVd = 15<sup>b/</sup> wt-% or less of the solvent input <b>Or</b> total ELV of 0.35 kg or less of VOC / kg of solid input]</p>	<p>[ELVc = 50 mg C/Nm<sup>3</sup> for drying and 75 mg C/Nm<sup>3</sup> for coating<sup>b/</sup> ELVd = 20<sup>b/</sup> wt-% or less of the solvent input <b>Or</b> total ELV of 0.375 kg or less of VOC / kg of solid input]</p>

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New and existing installations: coating of metal surfaces (solvent consumption > 15 tonnes/y)	[ELVc = 50 mg C/Nm <sup>3</sup> for drying and 75 mg C/Nm <sup>3</sup> for coating <sup>b/</sup> ELVd = 10 <sup>b/</sup> wt-% or less of the solvent input Or total ELV of 0.20 kg or less of VOC / kg of solid input]	[ELVc = 50 mg C/Nm <sup>3</sup> for drying and 75 mg C/Nm <sup>3</sup> for coating <sup>b/</sup> ELVd = 15 <sup>b/</sup> wt-% or less of the solvent input Or total ELV of 0.33 kg or less of VOC / kg of solid input]	[ELVc = 50 mg C/Nm <sup>3</sup> for drying and 75 mg C/Nm <sup>3</sup> for coating <sup>b/</sup> ELVd = 20 <sup>b/</sup> wt-% or less of the solvent input Or total ELV of 0.375 kg or less of VOC / kg of solid input]
	[-]	[-]	<b>[Exception for coatings in contact with food:</b> Total ELV of 0.5825 kg or less of VOC / kg of solid input]

a/ Limit value applies to coating applications and drying processes operated under contained conditions.

b/ If contained coating conditions are not possible (boat construction, aircraft coating, etc.), installations may be granted exemption from these values. The reduction scheme of appendix II is then to be used, unless it is demonstrated to the satisfaction of the competent authority that this option is not technically and economically feasible. In this case, the operator must demonstrate to the satisfaction of the competent authority that the best available technique is used.

c/ If, for textile coating, techniques are used which allow reuse of recovered solvents, the limit value shall be 150 mg C/Nm<sup>3</sup> for drying and coating together.

### 13. Coating processes (leather and winding wire coating):

**Table 6: Suggested options limit values for VOC for leather and winding wire coating**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>
	Option3 <sup>1/</sup>
New and existing installations: leather coating (solvent consumption > 10 tonnes/y)	[Total ELV of 150 g/m <sup>2</sup> <sup>a/</sup> ]
New and existing installations: leather coating (solvent consumption 10 - 25 tonnes/y)	[Total ELV of 85 g/m <sup>2</sup> ]
New and existing installations: leather coating (solvent consumption > 25 tonnes/y)	[Total ELV of 75 g/m <sup>2</sup> ]
New and existing installations: winding wire coating (solvent consumption > 5 tonnes/y)	[Total ELV of 10 g/kg applies for installations where average diameter of wire ≤ 0,1 mm]
	[Total ELV of 5 g/kg applies for all other installations]

a/ For leather coating activities in furnishing and particular leather goods used as small consumer goods like bags, belts, wallets, etc.

### 14. Coil coating:

[Tapez un texte]

**Table 7: Suggested options limit values for coil coating**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>		
	Option1 <sup>1/</sup>	Option2 <sup>1/</sup>	Option3 <sup>1/</sup>
Existing installation (solvent consumption > 25 tonnes/y)	[ELVc = 30mg <sup>a/</sup> C/Nm <sup>3</sup> ELVd = 5 wt-% or less of the solvent input <b>Or</b> total ELV of 0.225 kg or less of VOC/kg of solid input]	[ELVc = 50mg <sup>a/</sup> C/Nm <sup>3</sup> ELVd = 5 wt-% or less of the solvent input <b>Or</b> total ELV of 0.25 kg or less of VOC/kg of solid input]	[ELVc = 50mg <sup>a/</sup> C/Nm <sup>3</sup> ELVd = 10 wt-% or less of the solvent input <b>Or</b> total ELV of 0.45 kg or less of VOC/kg of solid input]
New installation (solvent consumption > 25 tonnes/y)	[ELVc = 30mg <sup>a/</sup> C/Nm <sup>3</sup> ELVd = 3 wt-% or less of the solvent input <b>Or</b> total ELV of 0.15 kg or less of VOC/kg of solid input]	[ELVc = 50mg <sup>a/</sup> C/Nm <sup>3</sup> ELVd = 3 wt-% or less of the solvent input <b>Or</b> total ELV of 0.18 kg or less of VOC/kg of solid input]	[ELVc = 50mg <sup>a/</sup> C/Nm <sup>3</sup> ELVd = 5 wt-% or less of the solvent input <b>Or</b> total ELV of 0.3 kg or less of VOC/kg of solid input]

<sup>a/</sup> If techniques are used which allow reuse of recovered solvent, the limit value shall be 150 mg C/Nm<sup>3</sup>.

[Tapez un texte]

11. Coating processes (metal and plastic surfaces in passenger cars, truck cabins, trucks, buses, wooden surfaces):

**Table 4. Limit values for NMVOC emissions released from coating processes in the car industry**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year) <sup>a/</sup>	Limit value <sup>b/</sup> for total emissions of NMVOCs
New installations, car coating (M1, M2)	> 15 (and > 5,000 coated items a year)	45 g NMVOC/m <sup>2</sup> or 1.3 kg/item and 33 g NMVOC/m <sup>2</sup>
Existing installations, car coating (M1, M2)	> 15 (and > 5,000 coated items a year)	60 g NMVOC/m <sup>2</sup> or 1.9 kg/item and 41 g NMVOC/m <sup>2</sup>
New and existing installations, car coating (M1, M2)	> 15 (5,000 coated monoocoques or > 3,500 coated chassis a year)	90 g NMVOC/m <sup>2</sup> or 1.5 kg/item and 70 g NMVOC/m <sup>2</sup>
New installations, coating of new truck cabins (N1, N2, N3)	> 15 (5,000 coated items a year)	65 g NMVOC/m <sup>2</sup>
New installations, coating of new truck cabins (N1, N2, N3)	> 15 (> 5,000 coated items a year)	55 g NMVOC/m <sup>2</sup>
Existing installations, coating of new truck cabins (N1, N2, N3)	> 15 (5,000 coated items a year)	85 g NMVOC/m <sup>2</sup>
Existing installations, coating of new truck cabins (N1, N2, N3)	> 15 (> 5,000 coated items a year)	75 g NMVOC/m <sup>2</sup>
New installations, coating of new trucks and vans (without cabin) (N1, N2, N3)	> 15 (2,500 coated items a year)	90 g NMVOC/m <sup>2</sup>
New installations, coating of new trucks and vans (without cabin) (N1, N2, N3)	> 15 (> 2,500 coated items a year)	70 g NMVOC/m <sup>2</sup>
Existing installations, coating of new trucks and vans (without cabin) (N1, N2, N3)	> 15 (2,500 coated items a year)	120 g NMVOC/m <sup>2</sup>
Existing installations, coating of new trucks and vans (without cabin) (N1, N2, N3)	> 15 (> 2,500 coated items a year)	90 g NMVOC/m <sup>2</sup>
New installations, coating of new buses (M3)	> 15 (2,000 coated items a year)	210 g NMVOC/m <sup>2</sup>
New installations, coating of new buses (M3)	> 15 (> 2,000 coated items a year)	150 g NMVOC/m <sup>2</sup>
Existing installations, coating of new buses (M3)	> 15 (2,000 coated items a year)	290 g NMVOC/m <sup>2</sup>
Existing installations, coating of new buses (M3)	> 15 (> 2,000 coated items a year)	225 g NMVOC/m <sup>2</sup>

a/ For a solvent consumption 15 Mg a year (coating of cars), table 14 on car refinishing applies.

b/ The total limit values are expressed in terms of mass of solvent (g) emitted in relation to the surface area of product (m<sup>2</sup>). The surface area of the product is defined as the surface area calculated from the total electrophoretic coating area and the surface area of any parts that might be added in successive phases of the coating process which are coated with the same coatings. The surface of the electrophoretic coating area is calculated using the formula: (2 x total weight of product shell): (average thickness of metal sheet x density of metal sheet).

[Tapez un texte]

**Table 5.— Limit values for NMVOC emissions released from coating processes in various industrial sectors**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year)	Limit value	Limit value for fugitive emission of NMVOCs (% of solvent input)
New and existing installations:— other coating, incl. metal, plastics, textile, fabric, foil and paper (excl. web screen printing for textiles, see printing)	5 – 15	100 <sup>a/ b/</sup> mg C/Nm <sup>3</sup>	25 <sup>b/</sup>
	>15	50/75 <sup>b/ c/ d/</sup> mg C/Nm <sup>3</sup>	20 <sup>b/</sup>
New and existing installations:— wood coating	15 – 25	100 <sup>a/</sup> mg C/Nm <sup>3</sup>	25
	>25	50/75 <sup>d/</sup> mg C/Nm <sup>3</sup>	20

a/ Limit value applies to coating applications and drying processes operated under contained conditions.

b/ If contained coating conditions are not possible (boat construction, aircraft coating, etc.), installations may be granted exemption from these values. The reduction scheme of paragraph 6 (a) is then to be used, unless it is demonstrated to the satisfaction of the competent authority that this option is not technically and economically feasible. In this case, the operator must demonstrate to the satisfaction of the competent authority that the best available technique is used.

c/ The first value applies to drying processes, the second to coating application processes.

d/ If, for textile coating, techniques are used which allow reuse of recovered solvents, the limit value shall be 150 mg C/Nm<sup>3</sup> for drying and coating together.

12. — Coil coating:

**Table 6.— Limit values for NMVOC emissions released from coil coating**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year)	Limit value (mg C/Nm <sup>3</sup> )	Limit value for fugitive emissions of NMVOCs (% of solvent input)
New installations—	>25	50 <sup>a/</sup>	5
Existing installations	>25	50 <sup>a/</sup>	10

— a/ If techniques are used which allow reuse of recovered solvent, the limit value shall be 150 mg C/Nm<sup>3</sup>.

[Tapez un texte]

15. Dry cleaning:

**Table 8: Suggested options limit values for dry cleaning**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>	
	Options1 and 2 <sup>1/</sup>	Option3 <sup>1/</sup>
New and existing installations (no threshold, all machines are concerned whatever the consumption is)	[Total ELV of 5 g VOC/kg (mass of cleaned and dried product <sup>a/</sup> )]	[Total ELV of 20 g VOC/kg (mass of cleaned and dried product <sup>a/</sup> )]

a/ Limit value for total emissions of VOCs calculated as mass of emitted solvent per mass of cleaned and dried product.

13. Dry cleaning:

**Table 7. Limit values for NMVOC emissions released from dry cleaning**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year)	Limit value
New and existing installations-	0	-20 g NMVOC/kg <sup>a/</sup>

a/ Limit value for total emissions of NMVOCs calculated as mass of emitted solvent per mass of cleaned and dried product.

16. Manufacturing of coatings, varnishes, inks and adhesives:

**Table 9: Suggested options limit values for manufacturing of coatings, varnishes, inks and adhesives**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>	
	Option1 <sup>1/</sup>	Option3 <sup>1/</sup>
New and existing installations with an annual organic solvent consumption between 100 and 1000 t	[-]	[ELVc = 150mg C/Nm <sup>3</sup> ELVd <sup>a/</sup> = 5 wt-% or less of the solvent input Or total ELV of 5 wt-% or less of the solvent input]
New and existing installations with an annual organic solvent consumption > 1000 t	[1 wt-% of solvent input]	[ELVc = 150mg C/Nm <sup>3</sup> ELVd <sup>a/</sup> = 3 wt-% or less of the solvent input Or total ELV of 3 wt-% or less of the solvent input]

a/ The fugitive limit value does not include solvents sold as part of a preparation in a sealed container.

[Tapez un texte]

14. Manufacturing of coatings, varnishes, inks and adhesives:

**Table 8. Limit values for NMVOC emissions released from manufacturing of coatings, varnishes, inks and adhesives**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year)	Limit value (mg C/Nm <sup>3</sup> )	Limit value for fugitive emissions of NMVOCs (% of solvent input)
New and existing installations	100 – 1,000	150 <sup>a/</sup>	5 <sup>a/ e/</sup>
	> 1,000	150 <sup>b/</sup>	3 <sup>b/ c/</sup>

a/ A total limit value of 5% of solvent input may be applied instead of using the waste gas concentration limit and the limit value for fugitive emissions of NMVOCs.

b/ A total limit value of 3% of solvent input may be applied instead of using the waste gas concentration limit and the limit value for fugitive emissions of NMVOCs.

c/ The fugitive limit value does not include solvents sold as part of a preparation in a sealed container.

17. Printing (flexography, heat set web offset, publication rotogravure etc.):

**Table 10: Suggested options limit values for printing processes**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>		
	Option1 <sup>1/</sup>	Option2 <sup>1/</sup>	Option3 <sup>1/</sup>
Heatset offset (solvent consumption 15 – 25 tonnes/y)	[ - ]	[ - ]	[ELVc = 100 mg C/Nm <sup>3</sup> ELVd = 30 wt-% or less of the solvent input <sup>a/</sup> ]
Heatset offset (solvent consumption > 25 tonnes/y)	For new and upgraded presses		
	[Total ELV = 5 wt-% or less of the ink consumption <sup>a/</sup> ]	[Total ELV = 10 wt-% or less of the ink consumption <sup>a/</sup> ]	[ELVc = 20 mg C/Nm <sup>3</sup> ELVd = 30 wt-% or less of the solvent input <sup>a/</sup> ]
	For existing presses		
	[Total ELV = 10 wt-% or less of the ink consumption <sup>a/</sup> ]	[Total ELV = 15 wt-% or less of the ink consumption <sup>a/</sup> ]	[ELVc = 20 mg C/Nm <sup>3</sup> ELVd = 30 wt-% or less of the solvent input <sup>a/</sup> ]
Publication gravure (solvent consumption > 25 tonnes/y)	For new installations		
	[Total ELV = 4 wt-% or less of the solvent input]	[Total ELV = 5 wt-% or less of the solvent input]	[ELVc = 75 mg C/Nm <sup>3</sup> ELVd = 10 wt-% or less of the solvent input Or total ELV of 0.6 kg or less of VOC/kg of solid input]
	For existing installations		
	[Total ELV = 5 wt-% or less of the solvent input]	[Total ELV = 7 wt-% or less of the solvent input]	[ELVc = 75 mg C/Nm <sup>3</sup> ]



[Tapez un texte]

			<p>ELVd = 15 wt-% or less of the solvent input</p> <p>Or total ELV of 0.8 kg or less of VOC/kg of solid input]</p>
Packaging rotogravure and flexography (solvent consumption 15 – 25 tonnes/y)	[-]	[-]	<p>[ELVc = 100 mg C/Nm<sup>3</sup></p> <p>ELVd = 25 wt-% or less of the solvent input</p> <p>Or total ELV of 1.2 kg or less of VOC/kg of solid input]</p>
Packaging rotogravure and flexography (solvent consumption 25 - 200 tonnes/y) and rotary screen printing (solvent consumption > 30 tonnes/y)	[-]	[-]	<p>[ELVc = 100 mg C/Nm<sup>3</sup></p> <p>ELVd = 20 wt-% or less of the solvent input</p> <p>Or total ELV of 1.0 kg or less of VOC/kg of solid input]</p>
Packaging rotogravure and flexography (solvent consumption > 200 tonnes/y)	<p>[For the entire installation</p> <p>ELVc = 100 mg C/Nm<sup>3</sup></p> <p>ELVd = 20 wt-% or less of the solvent input</p> <p><b>Or</b></p> <p>Total ELV = 25% of reference emission<sup>b/</sup></p> <p><b>AND</b> for the machines that are connected to abatement equipment</p>		<p>[ELVc = 100 mg C/Nm<sup>3</sup></p> <p>ELVd = 20 wt-% or less of the solvent input</p> <p>Or total ELV = 25% of reference emission<sup>b/</sup>]</p>
	<p>Total ELV = 10 wt-% or less of the reference emission<sup>b/</sup>, with incineration</p> <p>Total ELV = 12.5 wt-% or less of the reference emission<sup>b/</sup>, with solvent recovery</p>	<p>Total ELV = 12.5 wt-% or less of the reference emission<sup>b/</sup>, with incineration</p> <p>Total ELV = 15 wt-% or less of the reference emission<sup>b/</sup>, with solvent recovery</p>	
	<p><b>AND</b> for machines that are not connected to the abatement equipment:</p>		
	<p>Use low solvent or solvent-free products]</p>		

<sup>a/</sup> Residual solvent in the finished product are not taken into account in the calculation of the fugitive emission

<sup>b/</sup> Using the reference emission defined in annex IIb to the Solvent Directive 99/13/EC

[Tapez un texte]

15. — Printing (flexography, heat set web offset, publication rotogravure etc.):

**Table 9. — Limit values for NMVOC emissions released from printing processes**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year)	Limit value (mg C/Nm <sup>3</sup> )	Limit value for fugitive emissions of NMVOCs (% of solvent input)
New and existing installations: heat set web offset	15–25	400	30 <sup>a/</sup>
	>25	20	30 <sup>a/</sup>
New installations: publication rotogravure	>25	75	10
Existing installations: publication rotogravure	>25	75	15
New and existing installations: other rotogravure, flexography, rotary screen printing, lamination and varnishing units	15–25	400	25
	>25	400	20
New and existing installations: rotary screen printing on textiles, paperboard	>30	400	20

— a/ Solvent residue in finished products is not to be considered as part of the fugitive emissions of NMVOCs.

18. Manufacturing of pharmaceutical products:

**Table 11: Suggested options limit values for manufacturing of pharmaceutical products**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>			
	Options1 and 2 <sup>1/</sup>		Option3 <sup>1/</sup>	
New installations (solvent consumption > 50 tonnes/y)	[ELVc: For non oxidate techniques : 0.1 kg C/hour <sup>f</sup> or 20 mg C/Nm <sup>3 g/ d/</sup>		[ELVc = 20 mg C/Nm <sup>3 a/ b/</sup> ]	[ELVd = 5 wt-% or less of the solvent input <sup>b/</sup> ]
Existing installations (solvent consumption > 50 tonnes/y)	for thermal oxidation/incineration or catalytic oxidation < 0.05 kg C/hour* or < 5 mg C/Nm <sup>3 g/ e/</sup> ]		[ELVd = 5 wt-% or less of the solvent input <sup>e/</sup> ]	[ELVd = 15 wt-% or less of the solvent input <sup>e/</sup> ]

a/ If techniques are used which allow reuse of recovered solvents, the limit value shall be 150 mg C/Nm<sup>3</sup>.

[Tapez un texte]

b/ A total limit value of 5 % of solvent input may be applied instead of using the waste gas concentration limit and the limit value for fugitive emissions of VOCs.

c/ A total limit value of 15 % of solvent input may be applied instead of using the waste gas concentration limit and the limit value for fugitive emissions of VOCs.

d/ A total limit value of 3 % of solvent input may be applied instead of using the waste gas concentration limit and the limit value for fugitive emissions of VOCs

e/ A total limit value of 5 % of solvent input may be applied instead of using the waste gas concentration limit and the limit value for fugitive emissions of VOCs

f/ The averaging time relates to the emission profile, the levels relate to dry gas and Nm<sup>3</sup>

g/ The concentration level relates to volume flows without dilution by, e.g. volume flows from room or building ventilation

16. — Manufacturing of pharmaceutical products:

**Table 10. — Limit values for NMVOC emissions released from manufacturing of pharmaceutical products**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year)	Limit value (mg C/Nm <sup>3</sup> )	Limit value for fugitive emissions of NMVOCs (% of solvent input)
New installations	≥ 50	20 <sup>a/ b/</sup>	5 <sup>b/ d/</sup>
Existing installations	≥ 50	20 <sup>a/ e/</sup>	15 <sup>e/ d/</sup>

— a/ If techniques are used which allow reuse of recovered solvents, the limit value shall be 150 mg C/Nm<sup>3</sup>.

— b/ A total limit value of 5% of solvent input may be applied instead of using the waste gas concentration limit and the limit value for fugitive emissions of NMVOCs.

— c/ A total limit value of 15% of solvent input may be applied instead of using the waste gas concentration limit and the limit value for fugitive emissions of NMVOCs.

— d/ The fugitive limit value does not include solvents sold as part of a coatings preparation in a sealed container.

19. Conversion of natural or synthetic rubber:

**Table 12: Suggested options limit values for conversion of natural or synthetic rubber**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>
	Option3 <sup>1/</sup>
New and existing installations: conversion of natural or synthetic rubber (solvent consumption > 15 tonnes/y)	[ELVc = 20 <sup>a/ b/</sup> ELVd = 25 <sup>a/ c/</sup> Or total ELV = 25% of solvent input]

a/ A total limit value of 25% of solvent input may be applied instead of using the waste gas concentration limit and the limit value for fugitive emissions of VOCs.

b/ If techniques are used which allow reuse of recovered solvent, the limit value shall be 150 mg C/Nm<sup>3</sup>.

c/ The fugitive limit does not include solvents sold as part of a preparation in a sealed container.

[Tapez un texte]

17. — Conversion of natural or synthetic rubber:

**Table 11. Limit values for NMVOC emission released from conversion of natural or synthetic rubber**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year)	Limit value (mg C/Nm <sup>3</sup> )	Limit value for fugitive emissions of NMVOCs (% of solvent input)
New and existing installations: conversion of natural or synthetic rubber	>15	20 <sup>a/</sup> 15 <sup>b/</sup>	25 <sup>a/</sup> 20 <sup>a/</sup>

— a/ A total limit value of 25% of solvent input may be applied instead of using the waste gas concentration limit and the limit value for fugitive emissions of NMVOCs.

— b/ If techniques are used which allow reuse of recovered solvent, the limit value shall be 150 mg C/Nm<sup>3</sup>.

— c/ The fugitive limit does not include solvents sold as part of a preparation in a sealed container.

20. Surface cleaning:

**Table 13: Suggested options limit values for surface cleaning**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year)	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>			
		Options1 and 2 <sup>1/</sup>		Option3 <sup>1/</sup>	
New and existing installations: surface cleaning using substances associated with risk phrase R45, R46, R49, R60 and R61 and Halogenated solvent R40	1 - 5	[ELVc = 10 mg compound/Nm <sup>3</sup> ]	[ELVd = 1% of solvent input]	[ELVc = 20 mg compound/Nm <sup>3</sup> ]	[ELVd = 15 % of solvent input]
	> 5	[ELVc = 10 mg compound/Nm <sup>3</sup> ]	[ELVd = 0.5 % of solvent input]	[ELVc = 20 mg compound/Nm <sup>3</sup> ]	[ELVd = 10 % of solvent input]
New and existing installations:	2 - 10	[ELVc = 35 mg C/Nm <sup>3</sup> a/]	[ELVd = 10 % <sup>a/</sup> of solvent input]	[ELVc = 75 mg C/Nm <sup>3</sup> a/]	[ELVd = 20 % <sup>a/</sup> of solvent input]
	> 10	[ELVc = 35 mg	[ELVd = 7.5 %	[ELVc = 75 mg	[ELVd = 15 % <sup>a/</sup>

[Tapez un texte]

other surface cleaning		C/Nm <sup>3 a/</sup>	<sup>a/</sup> of solvent input]	C/Nm <sup>3 a/</sup>	of solvent input]
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a/ Installations which demonstrate to the competent authority that the average organic solvent content of all cleaning material used does not exceed 30% w/w are exempt from applying these values.

18. Surface cleaning:

**Table 12. Limit values for NMVOC emissions released from surface cleaning**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year)	Limit value	Limit value for fugitive emissions of NMVOCs (% of solvent input)
New and existing installations: surface cleaning using substances mentioned in paragraph 3 (w)	1-5	20 mg compound/Nm <sup>3</sup>	15
	>5	20 mg compound/Nm <sup>3</sup>	10
New and existing installations: other surface cleaning	2-10	75 mg C/Nm <sup>3 a/</sup>	20 <sup>a/</sup>
	>10	75 mg C/Nm <sup>3 a/</sup>	15 <sup>a/</sup>

a/ Installations which demonstrate to the competent authority that the average organic solvent content of all cleaning material used does not exceed 30% w/w are exempt from applying these values.

21. Vegetable oil and animal fat extraction and vegetable oil refining processes:

**Table 14: Suggested options limit values for extraction of vegetable and animal fat and refining of vegetable oil**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>
	Option3 <sup>1/</sup>
New and existing installations (solvent consumption > 10 tonnes/y)	<p>[Total ELV (kg VOC/Mg product)</p> <p>Animal fat: 1.5</p> <p>Castor: 3.0</p> <p>Rape seed: 1.0</p> <p>Sunflower seed: 1.0</p> <p>Soya beans (normal crush): 0.8</p> <p>Soya beans (white flakes): 1.2</p> <p>Other seeds and vegetable material: 3.0<sup>a/</sup></p> <p>All fractionation processes, excl. degumming <sup>b/</sup>: 1.5</p> <p>Degumming: 4.0 ]</p>

a/ Limit values for total emissions of VOCs from installations treating single batches of seeds or other vegetable material shall be set case by case by the competent authorities on the basis of the best available technologies.

b/ The removal of gum from the oil.

[Tapez un texte]

19. ~~Vegetable oil and animal fat extraction and vegetable oil refining processes:~~

**Table 13. ~~Limit values for NMVOC emissions released from extraction of vegetable and animal fat and refining of vegetable oil~~**

<del>Capacity, technique, further specification</del>	<del>Threshold value for solvent consumption (Mg/year)</del>	<del>Total limit value (kg/Mg)</del>
<del>New and existing installations</del>	<del>&gt; 10</del>	<del>Animal fat: 1.5</del> <del>Castor: 3.0</del> <del>Rape seed: 1.0</del> <del>Sunflower seed: 1.0</del> <del>Soya beans (normal crush): 0.8</del> <del>Soya beans (white flakes): 1.2</del> <del>Other seeds and vegetable material: 3.0<sup>a/</sup></del> <del>All fractionation processes, excl. degumming<sup>b/</sup>: 1.5</del> <del>Degumming: 4.0</del>

~~a/ Limit values for total emissions of NMVOCs from installations treating single batches of seeds or other vegetable material shall be set case by case by the competent authorities on the basis of the best available technologies.~~

~~b/ The removal of gum from the oil.~~

20. ~~Vehicle refinishing:~~

**Table 14. ~~Limit values for NMVOC emissions released from vehicle refinishing~~**

<del>Capacity, technique, further specification</del>	<del>Threshold value for solvent consumption (Mg/year)</del>	<del>Limit value (mg C/Nm<sup>3</sup>)</del>	<del>Limit value for fugitive emissions of NMVOCs (% of solvent input)</del>
<del>New and existing installations</del>	<del>≥0.5</del>	<del>50<sup>a/</sup></del>	<del>25</del>

~~a/ Compliance with limit values to be proven by 15-minute average measurements.~~

[Tapez un texte]

22. Impregnation of wooden surfaces:

**Table 15: Suggested options limit values for impregnation of wooden surfaces**

Capacity, technique, further specification	Suggested ELV for VOC [hourly, monthly, daily] <sup>2/</sup>		
	Option1 <sup>1</sup>	Option2 <sup>1</sup>	Option3 <sup>1</sup>
Wood preservation (solvent consumption > 25 tonnes/y)	[ELVc = 100 <sup>a/</sup> mg C/Nm <sup>3</sup> ELVd = 25 wt-% or less of the solvent input Or 7 kg or less of VOC / m <sup>3</sup> ]	[ELVc = 100 <sup>a/</sup> mg C/Nm <sup>3</sup> ELVd = 35 wt-% or less of the solvent input Or 9 kg or less of VOC / m <sup>3</sup> ]	[ELVc = 100 <sup>a/</sup> mg C/Nm <sup>3</sup> ELVd = 45 wt-% or less of the solvent input Or 11 kg or less of VOC / m <sup>3</sup> ]

a/ Does not apply to impregnation with creosote

21. Impregnation of wooden surfaces:

**Table 15. Limit values for NMVOC emissions released from impregnation of wooden surfaces**

Capacity, technique, further specification	Threshold value for solvent consumption (Mg/year)	Limit value (mg C/Nm <sup>3</sup> )	Limit value for fugitive emission of NMVOCs (% of solvent input)
New and existing installations	≥25	100 <sup>a/b/</sup>	45 <sup>b/</sup>

a/ Does not apply to impregnation with creosote.

b/ A total limit value of 11 kg solvent/m<sup>3</sup> of wood treated may be applied instead of using the waste gas concentration limit and the limit value for fugitive emissions of NMVOCs.

### B. Canada<sup>3</sup>

22. Limit values for controlling emissions of volatile organic compounds (VOCs) from new stationary sources in the following stationary source categories will be determined on the basis of available information on control technology and levels, including limit values applied in other countries, and the following documents:

- (a) Canadian Council of Ministers of the Environment (CCME). Environmental Code of Practice for the Reduction of Solvent Emissions from Dry Cleaning Facilities. December 1992. PN1053;
- (b) CCME. Environmental Guideline for the Control of Volatile Organic Compounds Process Emissions from New Organic Chemical Operations. September 1993. PN1108;
- (c) CCME. Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions from Equipment Leaks. October 1993. PN1106;

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- (d) CCME. A Program to Reduce Volatile Organic Compound Emissions by 40 Percent from Adhesives and Sealants. March 1994. PN1116;
- (e) CCME. A Plan to Reduce Volatile Organic Compound Emissions by 20 Percent from Consumer Surface Coatings. March 1994. PN1114;
- (f) CCME. Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks. June 1995. PN1180;
- (g) CCME. Environmental Code of Practice for Vapour Recovery during Vehicle Refueling at Service Stations and Other Gasoline Dispensing Facilities. (Stage II) April 1995. PN1184;
- (h) CCME. Environmental Code of Practice for the Reduction of Solvent Emissions from Commercial and Industrial Degreasing Facilities. June 1995. PN1182;
- (i) CCME. New Source Performance Standards and Guidelines for the Reduction of Volatile Organic Compound Emissions from Canadian Automotive Original Equipment Manufacturer (OEM) Coating Facilities. August 1995. PN1234;
- (j) CCME. Environmental Guideline for the Reduction of Volatile Organic Compound Emissions from the Plastics Processing Industry. July 1997. PN1276; and
- (k) CCME. National Standards for the Volatile Organic Compound Content of Canadian Commercial/Industrial Surface Coating Products - Automotive Refinishing. August 1997. PN1288.

### C. United States of America<sup>3</sup>

23. Limit values for controlling emissions of VOCs from new stationary sources in the following stationary source categories are specified in the following documents:

- (a) Storage Vessels for Petroleum Liquids - 40 Code of Federal Regulations (C.F.R.) Part 60, Subpart K, and Subpart Ka;
- (b) Storage Vessels for Volatile Organic Liquids - 40 C.F.R. Part 60, Subpart Kb;
- (c) Petroleum Refineries - 40 C.F.R. Part 60, Subpart J;
- (d) Surface Coating of Metal Furniture - 40 C.F.R. Part 60, Subpart EE;
- (e) Surface Coating for Automobile and Light Duty Trucks - 40 C.F.R. Part 60, Subpart MM;
- (f) Publication Rotogravure Printing - 40 C.F.R. Part 60, Subpart QQ;
- (g) Pressure Sensitive Tape and Label Surface Coating Operations - 40 C.F.R. Part 60, Subpart RR;
- (h) Large Appliance, Metal Coil and Beverage Can Surface Coating - 40 C.F.R. Part 60, Subpart SS, Subpart TT and Subpart WW;
- (i) Bulk Gasoline Terminals - 40 C.F.R. Part 60, Subpart XX;
- (j) Rubber Tire Manufacturing - 40 C.F.R. Part 60, Subpart BBB;
- (k) Polymer Manufacturing - 40 C.F.R. Part 60, Subpart DDD;
- (l) Flexible Vinyl and Urethane Coating and Printing - 40 C.F.R. Part 60, Subpart FFF;
- (m) Petroleum Refinery Equipment Leaks and Wastewater Systems - 40 C.F.R. Part 60, Subpart GGG and Subpart QQQ;
- (n) Synthetic Fiber Production - 40 C.F.R. Part 60, Subpart HHH;
- (o) Petroleum Dry Cleaners - 40 C.F.R. Part 60, Subpart JJJ;
- (p) Onshore Natural Gas Processing Plants - 40 C.F.R. Part 60, Subpart KKK;
- (q) SOCM I Equipment Leaks, Air Oxidation Units, Distillation Operations and Reactor Processes - 40 C.F.R. Part 60, Subpart VV, Subpart III, Subpart NNN and Subpart RRR;
- (r) Magnetic Tape Coating - 40 C.F.R. Part 60, Subpart SSS;
- (s) Industrial Surface Coatings - 40 C.F.R. Part 60, Subpart TTT; and
- (t) Polymeric Coatings of Supporting Substrates Facilities - 40 C.F.R. Part 60, Subpart VVV.



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#### Note

~~—1/ Monitoring is to be understood as an overall activity, comprising measuring of emissions, mass balancing, etc. It can be carried out continuously or discontinuously.~~

1/ The definitions of option 1, option 2 and option 3 are available in Informal document prepared by EGTEI for the 44th WGSR meeting. These options were designed to leave maximum flexibility for discussion at the WGSR.

2/ Proposed ELVs are based on BAT-AEL or current ELVs which usually are defined for a certain averaging period (mainly hourly, daily or monthly). The same averaging period could be also used for setting ELVs. See reference documents for more information. More specifics will be presented in the next drafts of the TA.

3/Up to now, no information has been provided by North America, then part B and C of the annex have not been modified yet.

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## Appendix I

### SOLVENT MANAGEMENT PLAN

#### Introduction

1. This appendix to the annex on limit values for emissions of non-methane volatile organic compounds (NMVOCs) from stationary sources provides guidance on carrying out a solvent management plan. It identifies the principles to be applied (para. 2), provides a framework for the mass balance (para. 3) and provides an indication of the requirements for verification of compliance (para. 4).

#### Principles

2. The solvent management plan serves the following purposes:  
(a) Verification of compliance, as specified in the annex; and  
(b) Identification of future reduction options.

#### Definitions

3. The following definitions provide a framework for the mass balance exercise:

(a) Inputs of organic solvents:

I1. The quantity of organic solvents or their quantity in preparations purchased that are used as input into the process in the time frame over which the mass balance is being calculated.

I2. The quantity of organic solvents or their quantity in preparations recovered and reused as solvent input into the process. (The recycled solvent is counted every time it is used to carry out the activity.)

(b) Outputs of organic solvents:

O1. Emission of NMVOCs in waste gases.

O2. Organic solvents lost in water, if appropriate taking into account waste-water treatment when calculating O5.

O3. The quantity of organic solvents that remains as contamination or residue in output of products from the process.

O4. Uncaptured emissions of organic solvents to air. This includes the general ventilation of rooms, where air is released to the outside environment via windows, doors, vents and similar openings.

O5. Organic solvents and/or organic compounds lost due to chemical or physical reactions (including, for example, those that are destroyed, e.g. by incineration or other waste-gas or waste-water treatments, or captured, e.g. by adsorption, as long as they are not counted under O6, O7 or O8).

O6. Organic solvents contained in collected waste.

O7. Organic solvents, or organic solvents contained in preparations, that are sold or are intended to be sold as a commercially valuable product.

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O8. Organic solvents contained in preparations recovered for reuse but not as input into the process, as long as they are not counted under O7.

O9. Organic solvents released in other ways.

Guidance on use of the solvent management plan for verification of compliance

4. The use of the solvent management plan will be determined by the particular requirement which is to be verified, as follows:

(a) Verification of compliance with the reduction option mentioned in paragraph 6 (a) of the annex, with a total limit value expressed in solvent emissions per unit product, or as otherwise stated in the annex.

(i) For all activities using the reduction option mentioned in paragraph 6 (a) of the annex, the solvent management plan should be put into effect annually to determine consumption. Consumption can be calculated by means of the following equation:

$$C = I1 - O8$$

A parallel exercise should also be undertaken to determine solids used in coating in order to derive the annual reference emission and the target emission each year;

(ii) For assessing compliance with a total limit value expressed in solvent emissions per unit product or as otherwise stated in the annex, the solvent management plan should be put into effect annually to determine emission of NMVOCs. Emission of NMVOCs can be calculated by means of the following equation:

$$E = F + O1$$

Where F is the fugitive emission of NMVOC as defined in subparagraph (b) (i) below. The emission figure should be divided by the relevant product parameter;

(b) Determination of fugitive emission of NMVOCs for comparison with fugitive emission values in the annex:

(i) Methodology: The fugitive emission of NMVOC can be calculated by means of the following equation:

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

or

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

This quantity can be determined by direct measurement of the quantities. Alternatively, an equivalent calculation can be made by other means, for instance by using the capture efficiency of the process.

The fugitive emission value is expressed as a proportion of the input, which can be calculated by means of the following equation:

$$I = I1 + I2$$

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(ii) Frequency: Fugitive emission of NMVOCs can be determined by a short but comprehensive set of measurements. This need not to be done again until the equipment is modified.

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## Appendix II

### REDUCTION SCHEME

#### Principles

1. The purpose of the reduction scheme is to allow the operator the possibility to achieve by other means emission reductions equivalent to those achieved if the limit values were to be applied. To that end the operator may use any reduction scheme specially designed for his installation, provided that in the end an equivalent emission reduction is achieved. Parties shall report on progress in achieving the same emission reduction, including experience with the application of the reduction scheme.

#### Practice

2. If applying coatings, varnishes, adhesives or inks, the following scheme can be used. Where it is inappropriate, the competent authority may allow an operator to apply any alternative exemption scheme which it is satisfied fulfils the principles outlined here. The design of the scheme takes into account the following facts:

(a) Where substitutes containing little or no solvent are still under development, a time extension must be given to the operator to implement his emission reduction plans;

(b) The reference point for emission reductions should correspond as closely as possible to the emissions that would have resulted had no reduction action been taken.

3. The following scheme shall operate for installations for which a constant solid content of product can be assumed and used to define the reference point for emission reductions:

(a) The operator shall forward an emission reduction plan which includes in particular decreases in the average solvent content of the total input and/or increased efficiency in the use of solids to achieve a reduction of the total emissions from the installation to a given percentage of annual reference emissions, termed the target emission.

This must be done in the following time frame: <sup>2</sup>

Time period		Maximum allowed total annual emissions
New installations	Existing installations	
By 31.10.2004	By 31.10.2005	Target emission x 1.5
By 31.10.2004	By 31.10.2007	Target emission

(b) The annual reference emission is calculated as follows:

(i) The total mass of solids in the quantity of coating and/or ink, varnish or adhesive consumed in a year is determined. Solids are all materials in coatings, inks, varnishes and adhesives that become solid once the water or the volatile organic compounds are evaporated;

(ii) The annual reference emissions are calculated by multiplying the mass determined as in subparagraph (i) by the appropriate factor listed in the table below. The competent authorities may adjust these factors for individual installations to reflect documented increased efficiency in the use of solids.

<sup>2</sup> Former specific values were deleted to let maximum flexibility to the Parties.

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Activity	Multiplication factor for use in subparagraph (b) (ii)
Retogravure printing; flexography printing; laminating as part of a printing activity; printing; varnishing as part of a printing activity; wood coating; coating of textiles, fabric, film or paper; adhesive coating	4
Coil coating; vehicle refinishing	3
Food contact coating; aerospace coating	2.33
Other coatings and rotary screen printing	1.5

(iii) The target emission is equal to the annual reference emission multiplied by a percentage equal to:

- (The fugitive emission value + 15), for installations in the following sectors:
- Vehicle coating (solvent consumption < 15 Mg/year) and vehicle refinishing;
- Metal, plastic, textile, fabric, film and paper coating (solvent consumption between 5 and 15 Mg/year);
- Coating of wooden surfaces (solvent consumption between 15 and 25 Mg/year).
- (The fugitive emission value + 5) for all other installations;

(iv) Compliance is achieved if the actual solvent emission determined from the solvent management plan is less than or equal to the target emission.