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**Options for revising the annexes to the Gothenburg Protocol to
Abate Acidification, Eutrophication and Ground-level Ozone:
technical annexes**

Draft revised annex VI

Note by the secretariat

Summary

This document presents proposals for amendments to annex VI to the Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone for consideration by the Working Group on Strategies and Review at its forty-ninth session. It is based on documents ECE/EB.AIR/WG.5/2009/19, ECE/EB.AIR/WG.5/2011/2, and further proposals made by the European Union and provisionally agreed at the forty-eighth session of the Working Group in April 2011.

This revised version has been prepared to reflect the request by the Working Group at its forty-ninth session to delete option 1.

Proposed new text is indicated in bold. Text in square brackets that is not marked for deletion has not been provisionally agreed by the Working Group.

Limit values for emissions of volatile organic compounds from stationary sources

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 VOC emissions listed in paragraphs 8 to 22 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 – ~~delete~~] **including** vehicle refuelling at service stations;

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

(c) “Wood and plastic lamination” means any activity to adhere together wood and/or plastic to produce laminated products;

(d) “Coating activity” means any activity in which a single or multiple application of a continuous film of coating is laid onto: [passenger cars, truck cabins, trucks, buses or wooden surfaces and covers any activity in which a single or multiple application of a continuous film of coating is laid onto: – ~~delete~~]

(i) New vehicles defined [(see below) – ~~delete~~] 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 – ~~delete~~]

(v) Other metallic and plastic surfaces including those of aeroplanes, ships, trains, etc.;

(vi) Wooden surfaces;

(vii) Textile, fabric, film and paper surfaces; and

(viii) Leather; [surfaces. – ~~delete~~]

This source category does not include the coating of substrates with metals by electrophoretic or chemical spraying techniques. If the coating activity includes a step in

which the same article is printed, that printing step is considered part of the coating activity. However, printing activities operated as a separate activity are not **covered by this definition** [included – ~~delete~~]. In this definition:

- 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 activity 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 [activity – ~~delete~~] **process**;

(f) "Dry cleaning" means any industrial or commercial activity 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 activity 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 sub-activities:

- (i) Flexography: a printing activity 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 activity 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 activity 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 [activity – ~~delete~~] **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 activity: the adhering of two or more flexible materials to produce laminates; and

(vii) Varnishing: an activity 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 activity of mixing, crushing, blending, calendering, extruding and vulcanization of natural or synthetic rubber and additionally activities for the processing of natural or synthetic rubber to derive an end product;

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

(l) [(p) – ~~delete~~] “Standard conditions” means a temperature of 273.15 K and a pressure of 101.3 kPa;

(m) “Organic compound” means any compound containing at least the element carbon and one or more of hydrogen, halogen, oxygen, sulphur, phosphorus, silicon or nitrogen, with the exception of carbon oxides and inorganic carbonates and bicarbonates;

(n) [(q) – ~~delete~~] “Volatile organic compound” (VOC) means any organic compound as well as the fraction of creosote, having at 293.15 K a vapour pressure of 0.01 kPa or more, or having a corresponding volatility under the particular conditions of use;

(o) [(r) – ~~delete~~] “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;

(p) [(s) – ~~delete~~] “Waste [gas – ~~delete~~] gases” means the final gaseous discharge containing VOCs or other pollutants from a stack or from emission abatement equipment into air. The volumetric flow rates shall be expressed in m³/h at standard conditions;

(q) [(l) – ~~delete~~] “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;

(r) [(m) – ~~delete~~] “Vehicle refinishing” means any industrial or commercial coating activity and associated degreasing activities performing;

- (i) 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 the coating of trailers (including semi-trailers);

[These activities are studied together with the coating of cars. – ~~delete~~]

- (ii) 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 **not covered by this annex, but the products used for it are** considered in annex XI[. – ~~delete~~];

(s) [(n) – ~~delete~~] “Wood impregnation” means any activity giving a loading of preservative in timber;

(t) [(o) – ~~delete~~] “Winding wire coating” means any coating activity of metallic conductors used for winding the coils in transformers and motors, etc;

(u) [(t) – ~~delete~~] “Fugitive emission [of VOCs – ~~delete~~]” means any emission, not in waste gases, of VOCs into air, soil and water as well as, unless otherwise stated, solvents contained in any product; [and – ~~delete~~] **this** includes uncaptured emissions of VOCs released to the outside environment via windows, doors, vents and similar openings. Fugitive [limit values – ~~delete~~] **emissions** [are – ~~delete~~] **may be** calculated on the basis of a solvent management plan (see appendix I to the present annex);

(v) [(u) – ~~delete~~] “Total emission of VOCs” means the sum of fugitive emission of VOCs and emission of VOCs in waste gases;

(w) [(v) – ~~delete~~] “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;

(x) [(w) – ~~delete~~] “**Emission limit value**” (ELV) means the maximum quantity of [a gaseous substance – ~~delete~~] **VOC (except methane)** [contained in the waste gases - ~~delete~~] **emitted** from an installation which is not to be exceeded during normal operation. [Unless otherwise specified – ~~delete~~] **For waste gases**, it [shall be calculated – ~~delete~~] **is expressed** in terms of mass of [pollutant – ~~delete~~] **VOC** per volume of waste gases (expressed as mg C/Nm³ unless specified otherwise), assuming standard conditions for temperature and pressure for dry gas. [For solvent-using installations, emission limit values are given as mass unit per characteristic unit of the respective activity. – ~~delete~~] 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 – ~~delete~~] **gases**. [Limit values generally address all volatile organic compounds except methane (no further distinction is made, e.g. in terms of reactivity or toxicity); – ~~delete~~] **Emission limit values for waste gases are indicated as ELVc; emission limit values for fugitive emissions are indicated as ELVf;**

(y) [(x) – ~~delete~~] “Normal operation” means all periods of operation except start-up and shutdown operations and maintenance of equipment;

(z) [(y) – ~~delete~~] “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;

(aa) [(z) – delete] “Footwear manufacture” means any activity of producing complete footwear or part of it;

(bb) **“Solvent consumption” means the total input of organic solvents into an installation per calendar year, or any other 12-month period, less any VOCs that are recovered for reuse.**

4. The following requirements shall be satisfied:

(a) Emissions shall be monitored^[1] – delete] in all cases **via measurements or through calculations achieving at least the same accuracy.** Compliance with **ELVs** [limit values can – delete] shall be verified **through** continuous or discontinuous measurements, type approval, or any other technically sound method. **For the emissions in waste gases,** in case of continuous measurements, compliance with the [emission standards – delete] **ELVs** is achieved if the validated **daily** [monthly – delete] emission average does not exceed the **ELVs**. In case of discontinuous measurements or other appropriate determination procedures, compliance with the [emission standards – delete] **ELVs** is achieved if the average of all the readings or other procedures **within one monitoring exercise** does not exceed the limit values. The inaccuracy of the [continuous and discontinuous – delete] measurement methods may be taken into account for verification purposes. **The fugitive and total ELVs apply as annual averages;**

(b) The concentrations of air pollutants in gas-carrying ducts shall be measured in a representative way. [Sampling and analysis – delete] **Monitoring** of relevant polluting substances and measurements of process parameters, as well as the quality assurance of automated systems and the reference [measurement methods – delete] **measurements** to calibrate those systems, 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.

5. The following [limit values should be applied – delete] **ELVs apply** for waste gases **containing substances harmful to human health**[, unless stated otherwise below – delete]:

(a) 20 mg [substance – delete]/Nm³ **(expressed as the mass sum of individual compounds)** for discharges of halogenated **VOCs**, [volatile organic compounds] which are assigned the following risk phrases: “suspected of causing cancer” and/or “suspected of causing genetic defects”, where the mass flow of the sum of the considered compounds is greater than or equal to 100 g/h; and

(b) 2 mg/Nm³ (expressed as the mass sum of individual compounds) for discharges of **VOCs**, [volatile organic compounds] which are assigned the following risk phrases: “may cause cancer”, “may cause genetic defects”, “may cause cancer by inhalation”, “may damage fertility”, “may damage the unborn child”, 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 8 to 22 below, the following revisions are relevant:

(a) Instead of applying the canalized and fugitive emission limit values (respectively ELVc and ELVf), operators may be allowed to comply with total emission limit values². The purpose is to allow the operator the possibility to achieve by other means

[¹ Monitoring is to be understood as an overall activity, comprising measuring or calculating of emissions, mass balancing, etc. It can be carried out continuously or discontinuously. – delete]

[² Total emission limit values defined in this annex are consistent with the implementation of a reduction scheme. – delete]

emission reductions, equivalent to those achieved if given limit values were to be applied; and

(b) For fugitive emissions of VOCs, the values set out below shall be applied as a limit value. However, – ~~delete~~]

For the source categories listed in paragraphs 9 to 22 where it is demonstrated to the satisfaction of the competent authority that for an individual installation **compliance with the fugitive emission limit value (ELVf)** [this value – ~~delete~~] 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 **and that** [. For each derogation, – ~~delete~~] the operator [must demonstrate – ~~delete~~] **demonstrates** to the satisfaction of the competent authority that the best available [technique is – ~~delete~~] **techniques are used**.

7. The limit values for VOC emissions for the source categories defined in paragraph 3 shall be as specified in paragraphs 8 to 22 below.

8. Storage and distribution of petrol:

(a) **Petrol storage installations at terminals, when above the threshold values mentioned in table 1, must be either:**

(i) **Fixed-roof tanks, which are connected to a vapour recovery unit meeting the ELVs set out in table 1 or;**

(ii) **Designed with a floating roof, either external or internal, equipped with primary and secondary seals meeting the reduction efficiency set out in table 1;**

(b) **As a derogation from the above-mentioned requirements, fixed-roof tanks, which were in operation prior to 1 January 1996 and which are not connected to a vapour recovery unit, must be equipped with a primary seal which is achieving a reduction efficiency of 90%.**

Table 1. Limit values for VOC emissions from the storage and distribution of petrol, excluding the loading of seagoing ships (stage I)

Activity	Threshold value	[Option 2 – delete]	Option 3
		ELV [in g/Nm ³ – delete] or reduction efficiency [in% or ELV in% w/w – delete]	
Loading and unloading of mobile container at terminals	5,000 m ³ petrol throughput annually	[As option 3 – delete]	10g VOC/Nm ³ including methane ^{a/}

Activity	Threshold value	[Option 2 – delete]	Option 3
		ELV [in g/Nm ³ – delete] or reduction efficiency [in% or ELV in% w/w – delete]	
Storage installations at terminals	Existing terminals or tank farms with a petrol throughput of 10,000 Mg/year or more New terminals (without thresholds except for terminals located in small remote islands with a throughput less than 5,000 Mg/year)	[97% (compared to a fixed roof tank without measures) – delete]	95% ^{b/} [(compared to a fixed roof tank without measures) – delete]
Service stations	Petrol throughput larger than 100 m ³ /year	[As option 3 – delete]	0.01% w/w of the throughput ^{c/} [^{b/} – delete]

^{a/} 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.

^{b/} **Reduction efficiency expressed in % compared to a comparable fixed-roof tank with no vapour-containment controls, i.e., with only a vacuum/pressure relief valve.**

[^{b/} – ~~delete~~]^{c/} Vapours displaced by the delivery of petrol into storage installations at service stations and in fixed-roof tanks used for the intermediate storage of vapours must be returned through a vapour-tight connection line to the mobile container delivering the petrol. Loading operations may not take place unless the arrangements are in place and properly functioning. **Under these conditions, no additional monitoring of the compliance with the limit value is required.**

Table 1 bis. Limit values for VOC emissions for car refuelling at service station (stage II)

Threshold values	[Option 2 [yearly average] – delete]	[Option 3 [yearly average] – delete]
	Minimum vapour capture efficiency % w/w ^{a/}	
New service station if its actual or intended throughput is greater than 500 m ³ per annum		
Existing service station if its actual or intended throughput is greater than 3,000 m ³ per annum as of 2019	[Equal to or greater than 85% w/w with a vapour/petrol ratio equal to or greater than 0.95 but less than or equal to 1.05 (v/v) – delete]	[No ELVs – delete]
Existing service station if its actual or intended throughput is greater than 500 m ³ per annum and which undergoes a major refurbishment		

^{a/} The capture efficiency of the systems has to be certified by the manufacturer in accordance with relevant technical standards or type approval procedures.

9. Adhesive coating:

Table 2. Limit values for adhesive coating

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	Option 2	Option 3
Footwear Manufacture (solvent consumption > 5 Mg/year)	[As option 3 – delete]	25 ^{a/} g VOC / pair of shoes
Other adhesive coating[, except footwear; new and existing installations – delete] (solvent consumption 5–15 Mg/year)	[As option 3 – delete]	ELVc = 50 mg ^{b/} C/Nm ³ ELVf = 25 wt-% or less of the solvent input Or total ELV of 1.2 kg or less of VOC/kg of solid input
Other adhesive coating[, except footwear; new and existing installations – delete] (solvent consumption 15–200 Mg/year)	[ELVc = 50 mg ^{c/} C/Nm ³ ELVf = 15 wt-% or less of the solvent input Or total ELV of 0.8 kg or less of VOC/kg of solid input – delete]	ELVc = 50 mg ^{b/} C/Nm ³ ELVf = 20 wt-% or less of the solvent input Or total ELV of 1 kg or less of VOC/kg of solid input

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	Option 2	Option 3
Other adhesive coating[, except footwear; new and existing installations – delete] (solvent consumption > 200 Mg/year)	ELVc = 50 mg ^{c/} C/Nm ³ ELVf = 15 wt-% or less of the solvent input <i>Or</i> total ELV of 0.8 kg or less of VOC/kg of solid input	[ELVc = 50 mg ^{b/} C/Nm ³ ELVf = 20 wt-% or less of the solvent input <i>Or</i> total ELV of 1 kg or less of VOC/kg of solid input – delete]

^{a/} Total **ELVs** 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/Nm³.

^{c/} If techniques are used which allow reuse of recovered solvent, the limit value shall be 100 mg C/Nm³.

^{d/} If techniques are used which allow reuse of recovered solvent, the limit value shall be 75 mg C/Nm³. – ~~delete~~

10. Wood and plastic lamination:

Table 3. [VOC emission ELV – ~~delete~~] **Limit values** for wood and plastic lamination

Activity and threshold	ELV for VOC [(yearly)]
	Options 1, 2 and 3
Wood and plastic laminating[; new and existing installations – delete] (solvent consumption > 5 Mg/year)	Total ELV of 30 g VOC/m ² of final product

11. Coating activities (vehicle coating industry):

Table 4. **Limit values** for coating activities in the vehicle industry

Activity and threshold	[Suggested – delete] ELV for VOC [(yearly for total ELV)]	
	Option 2 ^{a/}	Option 3 ^{a/}
Manufacture of cars (M1, M2) (solvent consumption > 15 Mg/year and ≤ 5,000 coated items a year or > 3,500 chassis built)	[As option 3 – delete]	90 g VOC/m ² or 1.5 kg/ body + 70 g/m ²
Manufacture of cars (M1, M2) (solvent consumption 15–200 Mg/year and > 5,000 coated items a year)	[35 g VOC/m ² or 1 kg/body + 26 g/m ² – delete]	<i>Existing installations:</i> 60g VOC/m ² or 1.9 kg/ body + 41 g/m ²
		<i>New installations:</i> 45 g VOC/m ² or 1.3 kg/body + 33 g/m ²

Activity and threshold	[Suggested – delete] ELV for VOC [(yearly for total ELV)]	
	Option 2 ^{a/}	Option 3 ^{a/}
Manufacture of cars (M1, M2) (solvent consumption > 200 Mg /year and > 5,000 coated items a year)	35 g VOC/m ² or 1 kg/body + 26 g/m ² ^{b/}	[Existing installations: 60 g VOC/m ² or 1.9 kg/body + 41 g/m ² – delete]
		[New installations: 45 g VOC/m ² or 1.3 kg/body + 33 g/m ² – delete]
Manufacture of truck cabins (N1, N2, N3) (solvent consumption > 15 Mg /year and ≤ 5,000 coated items/year)	[As option 3 – delete]	Existing installations: 85 g VOC/m ²
		New installations: 65 g VOC/m ²
Manufacture of truck cabins (N1, N2, N3) (solvent consumption 15–200 Mg /year and > 5,000 coated items a year)	[55 g VOC/m ² – delete]	Existing installations: 75 g VOC/m ²
		New installations: 55 g VOC/m ²
Manufacture of truck cabins (N1, N2, N3) (solvent consumption > 200 Mg /year and > 5,000 coated items a year)	55 g VOC/m ²	[Existing installations: 75 g VOC/m ² – delete]
		[New installations: 55 g VOC/m ² – delete]
Manufacture of trucks and vans (solvent consumption > 15 Mg /year and ≤ 2,500 coated items a year)	[As option 3 – delete]	Existing installations: 120 g VOC/m ²
		New installations: 90 g VOC/m ²
Manufacture of trucks and vans (solvent consumption 15–200 Mg /year and > 2,500 coated items a year)	[50 g VOC/m ² – delete]	Existing installations: 90 g VOC/m ²
		New installations: 70 g VOC/m ²
Manufacture of trucks and vans (solvent consumption > 200 Mg /year and > 2,500 coated items a year)	50 g VOC/m ²	[Existing installations: 90 g VOC/m ² – delete]
		[New installations: 70 g VOC/m ² – delete]
Manufacture of buses (solvent consumption > 15 Mg /year and ≤ 2,000 coated items a year)	[As option 3 – delete]	Existing installations: 290 g VOC/m ²
		New installations: 210 g VOC/m ²

Activity and threshold	[Suggested – delete] ELV for VOC [(yearly for total ELV)]	
	Option 2 ^{a/}	Option 3 ^{a/}
Manufacture of buses (solvent consumption 15–200 Mg /year and > 2,000 coated items a year)	[150 g VOC/m ² – delete]	<i>Existing installations</i> : 225 g VOC/m ²
		<i>New installations</i> : 150 g VOC/m ²
Manufacture of buses (solvent consumption > 200 Mg /year and > 2,000 coated items a year)	150 g VOC/m ²	[<i>Existing installations</i> : 225 g VOC/m ² – delete]
		[<i>New installations</i> : 150 g VOC/m ² – delete]

^{a/} The total limit values are expressed in terms of mass of **organic** solvent (g) emitted in relation to the surface area of product (m²). 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 top-coating 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.

^{b/} **For existing plants achieving these levels may entail cross-media effects, high capital costs and long payback periods. Major step decreases in VOC emissions necessitate changing the type of paint system and/or the paint application system and/or the drying system and this usually involves either a new installation or a complete refurbishment of a paint shop and requires significant capital investment.**

12. Coating activities (metal, [plastic, – ~~delete~~] textile, fabric, film, plastic, paper and wooden surfaces coating):

Table 5. Limit values for coating activities in various industrial sectors

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	Option 2	Option 3
[New and existing installations: – delete] Wood coating (solvent consumption 15–25 Mg /year)	[As option 3 – delete]	ELVc = 100 ^{a/} mg C/Nm ³ ELVf = 25 wt-% or less of the solvent input <i>Or</i> total ELV of 1.6 kg or less of VOC/kg of solid input
[New and existing installations: – delete] Wood coating (solvent consumption 25–200 Mg /year)	[ELVc = 50 mg C/Nm ³ for drying and 75 mg C/Nm ³ for coating ELVf = 15 wt-% or less of the solvent input <i>Or</i> total ELV of 0.75 kg or less of VOC/kg of solid input – delete]	ELVc = 50 mg C/Nm ³ for drying and 75 mg C/Nm ³ for coating ELVf = 20 wt-% or less of the solvent input <i>Or</i> total ELV of 1 kg or less of VOC/kg of solid input

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	Option 2	Option 3
[New and existing installations:-- delete Wood coating (solvent consumption >200 Mg /year)	ELVc = 50 mg C/Nm ³ for drying and 75 mg C/Nm ³ for coating ELVf = 15 wt-% or less of the solvent input <i>Or</i> total ELV of 0.75 kg or less of VOC/kg of solid input	[ELVc = 50 mg C/Nm ³ for drying and 75 mg C/Nm ³ for coating ELVf = 20 wt-% or less of the solvent input <i>Or</i> total ELV of 1 kg or less of VOC/kg of solid input – delete]
[New and existing installations: – delete Coating of metal and plastics, (solvent consumption 5–15 Mg /year)	[As option 3 – delete]	ELVc = 100 ^{a/, b/} mg C/Nm ³ ELVf = [20 – delete] 25 ^{b/} wt-% or less of the solvent input <i>Or</i> total ELV of [0.525 – delete] 0.6 kg or less of VOC/kg of solid input
[New and existing installations: – delete Other coating, including textile, fabric, [foil – delete] film and paper (excluding web screen printing for textiles, see printing) (solvent consumption 5–15 Mg /year)	[As option 3 – delete]	ELVc = 100 ^{a/, b/} mg C/Nm ³ ELVf = [20 – delete] 25 ^{b/} wt-% or less of the solvent input <i>Or</i> total ELV of [1.4 – delete] 1.6 kg or less of VOC/kg of solid input
[New and existing installations: – delete Textile, fabric, [foil – delete] film and paper coating (excluding web screen printing for textiles, see printing) (solvent consumption > 15 Mg /year)	[As option 3 – delete]	ELVc = 50 mg C/Nm ³ for drying and 75 mg C/Nm ³ for coating ^{b/, c/} ELVf = 20 ^{b/} wt-% or less of the solvent input <i>Or</i> total ELV of 1 kg or less of VOC/kg of solid input

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	Option 2	Option 3
[New and existing installations: – delete] Coating of plastic workpieces (solvent consumption 15–200 Mg/year)	<p>ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating^{b/}</p> <p>ELVf = 15^{b/} wt-% or less of the solvent input</p> <p>Or total ELV of 0.30 kg or less of VOC/kg of solid input – delete]</p>	<p>ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating^{b/}</p> <p>ELVf = 20^{b/} wt-% or less of the solvent input</p> <p>Or total ELV of 0.375 kg or less of VOC/kg of solid input</p>
[New and existing installations: – delete] Coating of plastic workpieces (solvent consumption > 200 Mg/year)	<p>ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating^{b/}</p> <p>ELVf = [15 – delete] 20^{b/} wt-% or less of the solvent input</p> <p>Or total ELV of [0.30 – delete] 0.35 kg or less of VOC/kg of solid input</p>	<p>[ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating^{b/}</p> <p>ELVf = 20^{b/} wt-% or less of the solvent input</p> <p>Or total ELV of 0.375 kg or less of VOC/kg of solid input – delete]</p>
[New and existing installations:– delete] Coating of metal surfaces (solvent consumption 15–200 Mg/year)	<p>[ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating^{b/}</p> <p>ELVf = 15^{b/} wt-% or less of the solvent input</p> <p>Or total ELV of 0.30 kg or less of VOC/kg of solid input – delete]</p>	<p>ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating^{b/}</p> <p>ELVf = 20^{b/} wt-% or less of the solvent input</p> <p>Or total ELV of 0.375 kg or less of VOC/kg of solid input</p>
	[As option 3 – delete]	<p>Exception for coatings in contact with food:</p> <p>Total ELV of 0.5825 kg or less of VOC/kg of solid input</p>
[New and existing installations: – delete] Coating of metal surfaces (solvent consumption >200 Mg/year)	<p>ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating^{b/}</p> <p>ELVf = [15 – delete] 20^{b/} wt-% or less of the solvent input</p> <p>Or total ELV of [0.30 – delete] 0.33 kg or less of VOC/kg of solid input</p>	<p>[ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating^{b/}</p> <p>ELVf = 20^{b/} wt-% or less of the solvent input</p> <p>Or total ELV of 0.375 kg or less of VOC/kg of solid input – delete]</p>

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	Option 2	Option 3
	[As option 3 – delete]	Exception for coatings in contact with food: 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 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/Nm³ for drying and coating together.

13. Coating activities (leather and winding wire coating):

Table 6. Limit values [for VOC – ~~delete~~] for leather and winding wire coating

Activity and threshold	ELV for VOC [(yearly for total ELV)]
	Option 1, 2 and 3
[New and existing installations: – delete] Leather coating in furnishing and particular leather goods used as small consumer goods like bags, belts, wallets, etc. (solvent consumption > 10 Mg/year)	Total ELV of 150 g/m ² [^{a/} – delete]
[New and existing installations: – delete] Other leather coating (solvent consumption 10–25 Mg/year)	Total ELV of 85 g/m ²
[New and existing installations: – delete] Other leather coating (solvent consumption > 25 Mg/year)	Total ELV of 75 g/m ²
[New and existing installations: – delete] Winding wire coating (solvent consumption > 5 Mg/year)	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. – ~~delete~~]

14. Coil coating:

Table 7. Limit values for coil coating

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	[Option 2 – delete]	Option 3
Existing installation (solvent consumption 25–200 Mg/year)	[ELVc = 50 mg ^{b/} C/Nm ³ ELVf = 5 wt-% or less of the solvent input <i>Or</i> total ELV of 0.3 kg or less of VOC/kg of solid input – delete]	ELVc = 50mg ^{a/} C/Nm ³ ELVf = 10 wt-% or less of the solvent input <i>Or</i> total ELV of 0.45 kg or less of VOC/kg of solid input
Existing installation (solvent consumption > 200 Mg/year)	[ELVc = 50 mg ^{b/} C/Nm ³ ELVf = 5 wt-% or less of the solvent input <i>Or</i> total ELV of 0.3 kg or less of VOC/kg of solid input – delete]	ELVc = 50mg ^{a/} C/Nm ³ ELVf = 10 wt-% or less of the solvent input <i>Or</i> total ELV of 0.45 kg or less of VOC/kg of solid input
New installation (solvent consumption 25–200 Mg/year)	[ELVc = 30mg ^{b/} C/Nm ³ ELVf = 5 wt-% or less of the solvent input <i>Or</i> total ELV of 0.18 kg or less of VOC/kg of solid input – delete]	ELVc = 50 mg C/Nm ³ ^{a/} ELVf = 5 wt-% or less of the solvent input <i>Or</i> total ELV of 0.3 kg or less of VOC/kg of solid input
New installation (solvent consumption > 200 Mg/year)	[ELVc = 30mg ^{b/} C/Nm ³ ELVf = 5 wt-% or less of the solvent input <i>Or</i> total ELV of 0.18 kg or less of VOC/kg of solid input – delete]	ELVc = 50 mg ^{a/} C/Nm ³ ELVf = 5 wt-% or less of the solvent input <i>Or</i> total ELV of 0.3 kg or less of VOC/kg of solid input

^{a/} If techniques are used which allow reuse of recovered solvent, the limit value shall be 150 mg C/Nm³.

^{b/} If techniques are used which allow reuse of recovered solvent, the limit value shall be 100 mg C/Nm³. – ~~delete~~]

15. Dry cleaning:

Table 8. Limit values for dry cleaning

Activity [and threshold – delete]	ELV for VOC ^{a/ b/} [(yearly for total ELV)]	
	[Option 2 – delete]	Option 3
New and existing installations [(no threshold, all machines are concerned whatever the consumption is) – delete]	[Total ELV of 5 g VOC/kg (mass of cleaned and dried product) ^{a/} – delete]	Total ELV of 20 g VOC/kg [(mass of cleaned and dried product) ^{a/} – delete]

^{a/} Limit value for total emissions of VOCs calculated as mass of emitted [solvent – ~~delete~~] VOC per mass of cleaned and dried product.

^{b/} This emission level can be achieved by using at least type IV machines or more efficient ones.

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

Table 9. Limit values form manufacturing of coatings, varnishes, inks and adhesives

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	[Option 2 – delete]	Option 3
New and existing installations with [an annual organic – delete] solvent consumption between 100 and 1,000 Mg/year	[Total ELV of 3 wt-% of solvent input – delete]	ELVc = 150mg C/Nm ³ ELVf ^{a/} = 5 wt-% or less of the solvent input <i>Or</i> total ELV of 5 wt-% or less of the solvent input
New and existing installations with [an annual organic – delete] solvent consumption > 1,000 Mg/year	[Total ELV of 2 wt-% of solvent input – delete]	ELVc = 150mg C/Nm ³ ELVf ^{a/} = 3 wt-% or less of the solvent input <i>Or</i> 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.

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

Table 10. Limit values for printing activities

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	Option 2	Option 3
Heat-set offset (solvent consumption 15–25 Mg/year)	[As option 3 – delete]	ELVc = 100 mg C/Nm ³ ELVf = 30 wt-% or less of the solvent input ^{a/}

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	Option 2	Option 3
Heat-set offset (solvent consumption 25–200 Mg /year)	[For new and upgraded presses – <u>delete</u>]	New and existing installations
	[Total ELV = 10 wt-% or less of the ink consumption ^{a/} – <u>delete</u>]	ELVc = 20 mg C/Nm ³ ELVf = 30 wt-% or less of the solvent input ^{a/}
	[For existing presses – <u>delete</u>]	
	[Total ELV = 15 wt-% or less of the ink consumption ^{a/} – <u>delete</u>]	
Heat-set offset (solvent consumption >200 Mg /year)	For new and upgraded presses	New and existing installations
	Total ELV = 10 wt-% or less of the ink consumption ^{a/}	[ELVc = 20 mg C/Nm ³ ELVf = 30 wt-% or less of the solvent input ^{a/} – <u>delete</u>]
	For existing presses	
	Total ELV = 15 wt-% or less of the ink consumption ^{a/}	
Publication gravure (solvent consumption 25–200 Mg /year)	For new installations	
	[Total ELV = 5 wt-% or less of the solvent input – <u>delete</u>]	ELVc = 75 mg C/Nm ³ ELVf = 10 wt-% or less of the solvent input <i>Or</i> total ELV of 0.6 kg or less of VOC/kg of solid input
	For existing installations	
	[Total ELV = 7 wt-% or less of the solvent input – <u>delete</u>]	ELVc = 75 mg C/Nm ³ ELVf = 15 wt-% or less of the solvent input <i>Or</i> total ELV of 0.8 kg or less of VOC/kg of solid input

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	Option 2	Option 3
Publication gravure (solvent consumption >200 Mg /year)	For new installations	
	Total ELV = 5 wt-% or less of the solvent input	[ELVc = 75 mg C/Nm ³ ELVf = 10 wt-% or less of the solvent input <i>Or</i> total ELV of 0.6 kg or less of VOC/kg of solid input – delete]
	For existing installations	
	Total ELV = 7 wt-% or less of the solvent input	[ELVc = 75 mg C/Nm ³ ELVf = 15 wt-% or less of the solvent input <i>Or</i> total ELV of 0.8 kg or less of VOC/kg of solid input – delete]
Packaging rotogravure and flexography (solvent consumption 15–25 Mg /year)	[As option 3 – delete]	ELVc = 100 mg C/Nm ³ ELVf = 25 wt-% or less of the solvent input <i>Or</i> total ELV of 1.2 kg or less of VOC/kg of solid input
Packaging rotogravure and flexography (solvent consumption 25–200 Mg /year) and rotary screen printing (solvent consumption > 30 Mg /year)	[As option 3 – delete]	ELVc = 100 mg C/Nm ³ ELVf = 20 wt-% or less of the solvent input <i>Or</i> total ELV of 1.0 kg or less of VOC/kg of solid input

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	Option 2	Option 3
Packaging rotogravure and flexography (solvent consumption > 200 Mg/year)	<p><i>For plants with all machines connected to oxidation:</i></p> <p>Total ELV = [10% of the reference emission ^{b/} – delete] 0.5 kg VOC/kg of solid input</p> <p><i>For plants with all machines connected to carbon adsorption:</i></p> <p>Total ELV = [12.5% of the reference emission ^{b/} – delete] 0.6 kg VOC/kg of solid input</p> <p><i>For existing mixed plants where some existing machines may not be attached to an incinerator or solvent recovery:</i></p> <p>Emissions from <i>the machines connected to oxidizers or carbon adsorption</i> are below the emission limits of [10% or 12.5% – delete] 0.5 or 0.6 kg VOC/kg of solid input respectively.</p> <p><i>For machines not connected to gas treatment:</i> use of low solvent or solvent free products, connection to waste gas treatment when there is spare capacity and preferentially run high solvent content work on machines connected to waste gas treatment.</p> <p>Total emissions below 1.0 kg VOC/kg of solid input [25% of reference emission (as defined in annex IIb of the Solvent Directive ^{b/}) – delete]</p>	<p>[ELVc = 100 mg C/Nm³</p> <p>ELVf = 20 wt-% or less of the solvent input</p> <p>Or total ELV = 25% of reference emission ^{b/} – delete]</p>

^{a/} Residual solvent in the finished product is not taken into account in the calculation of the fugitive emission.

18. Manufacturing of pharmaceutical products:

Table 11. Limit values for manufacturing of pharmaceutical products

Activity and threshold	[Suggested – delete] ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]			
	[Option 2 – delete]		Option 3	
New installations (solvent consumption > 50 Mg/year)	[ELVc: For non oxidating techniques: 0.1 kg C/hour ^f or 20 mg C/Nm ³ g/ ^{d/} delete]	[ELVf = 3 wt-% or less of the solvent input ^{d/} – delete]	ELVc = 20 mg C/Nm ³ a/,b/	ELVf = 5 wt-% or less of the solvent input ^{b/}
Existing installations (solvent consumption > 50 Mg/year)	for thermal oxidation/ incineration or catalytic oxidation < 0.05 kg C/hour or < 5 mg C/ Nm ³ g/ ^e – delete]	[ELVf = 5 wt-% or less of the solvent input ^{e/} – delete]	ELVc = 20 mg C/Nm ³ a/, c/	ELVf = 15 wt-% or less of the solvent input ^{c/}

^{a/} If techniques are used which allow reuse of recovered solvents, the limit value shall be 150 mg C/Nm³.

^{b/} A total limit value of 5% of solvent input may be applied instead of applying ELVc and ELVf.

^{c/} A total limit value of 15% of solvent input may be applied instead of applying ELVc and ELVf.

^{d/} A total limit value of 3% of solvent input may be applied instead of applying ELVc and ELVf – ~~delete~~]

^{e/} A total limit value of 5% of solvent input may be applied instead of applying ELVc and ELVf – ~~delete~~]

^{f/} The averaging time relates to the emission profile, the levels relate to dry gas and Nm³ – ~~delete~~]

^{g/} The concentration level relates to volume flows without dilution by, e.g. volume flows from room or building ventilation – ~~delete~~]

19. Conversion of natural or synthetic rubber:

Table 12. Limit values for conversion of natural or synthetic rubber

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]
	Options 1, 2 and 3
New and existing installations: conversion of natural or synthetic rubber (solvent consumption > 15 Mg/year)	ELVc = 20 ^{a/} ELVf = 25 ^{b/} Or total ELV = 25% of solvent input

^{a/} If techniques are used which allow reuse of recovered solvent, the limit value shall be 150 mg C/Nm³.

^{b/} The fugitive limit does not include solvents sold as part of a preparation in a sealed container.

20. Surface cleaning:

Table 13. Limit values for surface cleaning

Activity and threshold	Threshold value for solvent consumption (Mg/year)	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]			
		[Option 2 – delete]		Option 3	
[New and existing installations: – delete] Surface cleaning using substances mentioned in paragraph 3 [(y) – delete] (z)(i) of this annex	1–5	[ELVc = 10 mg compound /Nm ³ – delete]	[ELVf = 1% of solvent input – delete]	ELVc = 20 mg compound/Nm ³	ELVf = 15% of solvent input
	> 5	[ELVc = 10 mg compound /Nm ³ – delete]	[ELVf = 0.5% of solvent input – delete]	ELVc = 20 mg compound/Nm ³	ELVf = 10% of solvent input
[New and existing installations: – delete] Other surface cleaning	2–10	[As option 3 – delete]	[As option 3 – delete]	ELVc = 75 mg C/Nm ³ ^{a/}	ELVf = 20% ^{a/} of solvent input
	> 10	[As option 3 – delete]	[As option 3 – delete]	ELVc = 75 mg C/Nm ³ ^{a/}	ELVf = 15% ^{a/} of solvent input

^{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. Limit values for extraction of vegetable and animal fat and refining of vegetable oil

Activity and threshold	ELV for VOC [(yearly for total ELV)]	
	Options 1, 2 and 3	
New and existing installations (solvent consumption > 10 Mg/year)	Total ELV (kg VOC/Mg product)	
	Animal fat:	1.5
	Castor:	3.0
	Rape seed:	1.0
	Sunflower seed:	1.0
	Soya beans (normal crush):	0.8
	Soya beans (white flakes):	1.2
	Other seeds and vegetable material:	3.0 ^{a/}
	All fractionation processes, excluding degumming: ^{b/}	1.5
	Degumming:	4.0

^{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 **techniques** [technologies – ~~delete~~].

^{b/} The removal of gum from the oil.

22. Impregnation of **wood**: [wooden surfaces – ~~delete~~]Table 15. Limit values for impregnation of **wood** [wooden surfaces – ~~delete~~]

Activity and threshold	ELV for VOC [(daily for ELVc and yearly for ELVf and total ELV)]	
	Option 2	Option 3
Wood [preservation – delete] impregnation (solvent consumption 25–200 Mg/year)	[ELVc = 100 ^{a/} mg C/Nm ³ ELVf = 35 wt-% or less of the solvent input <i>Or</i> 9 kg or less of VOC/m ³ – delete]	ELVc = 100 ^{a/} mg C/Nm ³ ELVf = 45 wt-% or less of the solvent input <i>Or</i> 11 kg or less of VOC/m ³
Wood [preservation – delete] impregnation (solvent consumption > 200 Mg/year)	ELVc = 100 ^{a/} mg C/Nm ³ ELVf = 35 wt-% or less of the solvent input <i>Or</i> 9 kg or less of VOC/m ³	[ELVc = 100 ^{a/} mg C/Nm ³ ELVf = 45 wt-% or less of the solvent input <i>Or</i> 11 kg or less of VOC/m ³ – delete]

^{a/} Does not apply to impregnation with creosote.

B. Canada

23. [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: – ~~delete~~] **[Limit values for controlling emissions of VOCs will be determined for stationary sources, as appropriate, taking into account information on available control technologies, limit values applied in other jurisdictions, and the documents below. These documents vary in the degree to which they are mandatory, and in some cases the authority for implementation is not at the federal level, but rests with sub-national jurisdictions. The inclusion of a particular document should not be understood to imply that Canada agrees to be bound by it under the Gothenburg Protocol:**

(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; – ~~delete~~] **VOC Concentration Limits for Architectural Coatings Regulations - SOR/2009-264;**

(b) **VOC Concentration Limits for Automotive Refinishing Products. SOR/2009-197;**

(c) **Proposed regulations for VOC Concentrations Limits for Certain Products;**

(d) **Guidelines for the Reduction of Ethylene Oxide Releases from Sterilization Applications;**

(e) [(b) CCME. – ~~delete~~] Environmental Guideline for the Control of Volatile Organic Compounds Process Emissions from New Organic Chemical Operations. [September 1993. – ~~delete~~] PN1108;

(f) [(c) CCME. – ~~delete~~] Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions from Equipment Leaks. [October 1993. – ~~delete~~] PN1106;

(g) [(d) CCME. – ~~delete~~] A Program to Reduce Volatile Organic Compound Emissions by 40 Percent from Adhesives and Sealants. [March 1994. – ~~delete~~] PN1116;

(h) [(e) CCME. – ~~delete~~] A Plan to Reduce [Volatile Organic Compound – ~~delete~~] VOC Emissions by 20 Percent from Consumer Surface Coatings. [March 1994. – ~~delete~~] PN1114;

(i) [(f) CCME. – ~~delete~~] Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks. [June 1995. – ~~delete~~] PN1180;

(j) [(g) CCME. – ~~delete~~] Environmental Code of Practice for Vapour Recovery during Vehicle Refueling at Service Stations and Other Gasoline Dispensing Facilities. [(Stage II) April 1995. – ~~delete~~] PN1184;

(k) [(h) CCME. – ~~delete~~] Environmental Code of Practice for the Reduction of Solvent Emissions from Commercial and Industrial Degreasing Facilities. [June 1995. – ~~delete~~] PN1182;

(l) [(i) CCME. – ~~delete~~] 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. – ~~delete~~] PN1234;

(m) [(j) CCME. – ~~delete~~] Environmental Guideline for the Reduction of Volatile Organic Compound Emissions from the Plastics Processing Industry. [July 1997. – ~~delete~~] PN1276; [and – ~~delete~~]

[(k) CCME. National Standards for the Volatile Organic Compound Content of Canadian Commercial/Industrial Surface Coating Products — Automotive Refinishing. August 1997. PN1288. – ~~delete~~]

(n) National Action Plan for the Environmental Control of Ozone-depleting substances and their halocarbon alternatives. PN1291;

(o) Management Plan for Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOCs) - Phase I. PN1066;

(p) Environmental Code of Practice for the Reduction of Volatile Organic Compound Emissions from the Commercial/Industrial Printing Industry. PN1301;

(q) Recommended CCME Standards and Guidelines for the Reduction of VOC Emissions from Canadian Industrial Maintenance Coatings. PN1320; and

(r) Guidelines for the Reduction of VOC Emissions in the Wood Furniture Manufacturing Sector. PN1338.]

C. United States of America

24. 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 - ~~delete~~]
- (t) Polymeric Coatings of Supporting Substrates Facilities — 40 C.F.R. Part 60, Subpart VVV;
- (u) Stationary Internal Combustion Engines — Spark Ignition, 40 C.F.R. Part 60, Subpart JJJJ;**
- (v) Municipal Solid Waste Landfills — 40 C.F.R. Part 60, Subpart WWW;**
- (w) SOCM I Wastewater — 40 C.F.R. Part 60, Subpart YYY;**
- (x) Portland cement — 40 C.F.R. Part 60, Subpart F; and**
- (y) Stationary Internal Combustion Engines — Compression Ignition, 40 C.F.R. Part 60, Subpart IIII.**

25. Limit values for controlling emissions of VOC from sources subject to National Volatile Organic Compound Emission Standards for Consumer and Commercial Products are specified in the following documents:

- (a) Automobile refinish coatings — 40 C.F.R. Part 59, Subpart B;**
- (b) Consumer products — 40 C.F.R. Part 59, Subpart C;**

- (c) Architectural coatings — 40 C.F.R. Part 59, Subpart D;
- (d) Aerosol coatings — 40 C.F.R. Part 59, Subpart E; and
- (e) New and in-use portable fuel containers — 40 C.F.R. Part 59, Subpart F.

26. Limit values for controlling emissions of VOC from new and existing sources subject to National Emission Standards for Hazardous Air Pollutants (HAPs) are specified in the following documents:

- (a) Organic HAPs from the Synthetic Organic Chemical Manufacturing Industry — 40 C.F.R. Part 63, Subpart F;
- (b) Organic HAPs from the Synthetic Organic Chemical Manufacturing Industry: Process Vents, Storage Vessels, Transfer Operations, and Wastewater — 40 C.F.R. Part 63, Subpart G;
- (c) Organic HAPs: Equipment Leaks — 40 C.F.R. Part 63, Subpart H;
- (d) Coke oven batteries — 40 C.F.R. Part 63, Subpart L;
- (e) Commercial ethylene oxide sterilizers — 40 C.F.R. Part 63, Subpart O;
- (f) Bulk gasoline terminals and pipeline breakout stations — 40 C.F.R. Part 63, Subpart R;
- (g) Halogenated solvent degreasers — 40 C.F.R. Part 63, Subpart T;
- (h) Polymers and resins (Group I) — 40 C.F.R. Part 63, Subpart U;
- (i) Polymers and resins (Group II) — 40 C.F.R. Part 63, Subpart W;
- (j) Secondary lead smelters — 40 C.F.R. Part 63, Subpart X;
- (k) Marine tank vessel loading — 40 C.F.R. Part 63, Subpart Y;
- (l) Petroleum refineries — 40 C.F.R. Part 63, Subpart CC;
- (m) Offsite waste and recovery operations — 40 C.F.R. Part 63, Subpart DD;
- (n) Magnetic tape manufacturing — 40 C.F.R. Part 63, Subpart EE;
- (o) Aerospace manufacturing — 40 C.F.R. Part 63, Subpart GG;
- (p) Oil and natural gas production — 40 C.F.R. Part 63, Subpart HH;
- (q) Ship building and ship repair — 40 C.F.R. Part 63, Subpart II;
- (r) Wood furniture — 40 C.F.R. Part 63, Subpart JJ;
- (s) Printing and publishing — 40 C.F.R. Part 63, Subpart KK;
- (t) Pulp and paper II (combustion) — C.F.R. Part 63, Subpart MM;
- (u) Storage tanks — 40 C.F.R. Part 63, Subpart OO;
- (v) Containers — 40 C.F.R. Part 63, Subpart PP;
- (w) Surface impoundments — 40 C.F.R. Part 63, Subpart QQ;
- (x) Individual drain systems — 40 C.F.R. Part 63, Subpart RR;
- (y) Closed vent systems — 40 C.F.R. Part 63, Subpart SS;
- (z) Equipment leaks: control level 1 — 40 C.F.R. Part 63, Subpart TT;
- (aa) Equipment leaks: control level 2 — 40 C.F.R. Part 63, Subpart UU;

- (bb) Oil-Water Separators and Organic-Water Separators — 40 C.F.R. Part 63, Subpart VV;
- (cc) Storage Vessels (Tanks): Control Level 2 — 40 C.F.R. Part 63, Subpart WW;
- (dd) Ethylene Manufacturing Process Units — 40 C.F.R. Part 63, Subpart XX;
- (ee) Generic Maximum Achievable Control Technology Standards for several categories — 40 C.F.R. Part 63, Subpart YY;
- (ff) Mineral wool manufacturing — 40 C.F.R. Part 63, Subpart DDD;
- (gg) Hazardous waste combustors — 40 C.F.R. Part 63, Subpart EEE;
- (hh) Pharmaceutical manufacturing — 40 C.F.R. Part 63, Subpart GGG;
- (ii) Natural Gas Transmission and Storage — 40 C.F.R. Part 63, Subpart HHH;
- (jj) Flexible Polyurethane Foam Production — 40 C.F.R. Part 63, Subpart III;
- (kk) Polymers and Resins: group IV — 40 C.F.R. Part 63, Subpart JJJ;
- (ll) Portland cement manufacturing — 40 C.F.R. Part 63, Subpart LLL;
- (mm) Pesticide active ingredient production — 40 C.F.R. Part 63, Subpart MMM;
- (nn) Wool fiberglass manufacturing — 40 C.F.R. Part 63, Subpart NNN;
- (oo) Polymers and resins: group III — 40 C.F.R. Part 63, Subpart OOO;
- (pp) Polyether polyols — 40 C.F.R. Part 63, Subpart PPP;
- (qq) Secondary aluminum production — 40 C.F.R. Part 63, Subpart RRR;
- (rr) Petroleum refineries — 40 C.F.R. Part 63, Subpart UUU;
- (ss) Publicly owned treatment works — 40 C.F.R. Part 63, Subpart VVV;
- (tt) Nutritional Yeast Manufacturing — 40 C.F.R. Part 63, Subpart CCCC;
- (uu) Plywood and composite wood products — 40 C.F.R. Part 63, Subpart DDDD;
- (vv) Organic liquids distribution (non-gasoline) — 40 C.F.R. Part 63, Subpart EEEE;
- (ww) Miscellaneous organic chemical manufacturing — 40 C.F.R. Part 63, Subpart FFFF;
- (xx) Solvent Extraction for Vegetable Oil Production — 40 C.F.R. Part 63, Subpart GGGG;
- (yy) Wet Formed Fiberglass Mat Production — 40 C.F.R. Part 63, Subpart HHHH;
- (zz) Auto and Light Duty Truck Coatings — 40 C.F.R. Part 63, Subpart IIII;
- (aaa) Paper and Other Web Coating — 40 C.F.R. Part 63, Subpart JJJJ;
- (bbb) Surface Coatings for Metal Cans — 40 C.F.R. Part 63, Subpart KKKK;

- (ccc) Miscellaneous Metal Parts and Products Coatings — 40 C.F.R. Part 63, Subpart MMMM;
- (ddd) Surface Coatings for Large Appliances — 40 C.F.R. Part 63, Subpart NNNN;
- (eee) Printing, Coating and Dyeing of Fabric — 40 C.F.R. Part 63, Subpart OOOO;
- (fff) Surface Coating of Plastic Parts and Products — 40 C.F.R. Part 63, Subpart PPPP;
- (ggg) Surface Coating of Wood Building Products — 40 C.F.R. Part 63, Subpart QQQQ;
- (hhh) Metal Furniture Surface Coating — 40 C.F.R. Part 63, Subpart RRRR;
- (iii) Surface coating for metal coil — 40 C.F.R. Part 63, Subpart SSSS;
- (jjj) Leather finishing operations — 40 C.F.R. Part 63, Subpart TTTT;
- (kkk) Cellulose products manufacturing — 40 C.F.R. Part 63, Subpart UUUU;
- (lll) Boat manufacturing — 40 C.F.R. Part 63, Subpart VVVV;
- (mmm) Reinforced Plastics and Composites Production — 40 C.F.R. Part 63, Subpart WWWW;
- (nnn) Rubber tire manufacturing — 40 C.F.R. Part 63, Subpart XXXX;
- (ooo) Stationary Combustion Engines — 40 C.F.R. Part 63, Subpart YYYY;
- (ppp) Stationary Reciprocating Internal Combustion Engines: Compression Ignition — 40 C.F.R. Part 63, Subpart ZZZZ;
- (qqq) Semiconductor manufacturing — 40 C.F.R. Part 63, Subpart BBBB;
- (rrr) Iron and steel foundries — 40 C.F.R. Part 63, Subpart EEEEE;
- (sss) Integrated iron and steel manufacturing — 40 C.F.R. Part 63, Subpart FFFFF;
- (ttt) Asphalt Processing and Roofing Manufacturing — 40 C.F.R. Part 63, Subpart LLLLL;
- (uuu) Flexible Polyurethane Foam Fabrication — 40 C.F.R. Part 63, Subpart MMMMM;
- (vvv) Engine test cells/stands — 40 C.F.R. Part 63, Subpart PPPPP;
- (www) Friction products manufacturing — 40 C.F.R. Part 63, Subpart QQQQQ;
- (xxx) Refractory products manufacturing — 40 C.F.R. Part 63, Subpart SSSSS;
- (yyy) Hospital ethylene oxide sterilizers — 40 C.F.R. Part 63, Subpart WWWW;
- (zzz) Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities — 40 C.F.R. Part 63, Subpart BBBBB;
- (aaaa) Gasoline Dispensing Facilities — 40 C.F.R. Part 63, Subpart CCCCC;
- (bbbb) Paint Stripping and Miscellaneous Surface Coating Operations at Area Sources — 40 C.F.R. Part 63, Subpart HHHHH;

(cccc) Acrylic Fibers/Modacrylic Fibers Production (Area Sources) — 40
C.F.R. Part 63, Subpart LLLLLL;

(dddd) Carbon Black Production (Area Sources) — 40 C.F.R. Part 63,
Subpart MMMMMM;

(eeee) Chemical Manufacturing Area Sources: Chromium Compounds —
40 C.F.R. Part 63, Subpart NNNNNN;

(ffff) Chemical Manufacturing for Area Sources — 40 C.F.R. Part 63,
Subpart VVVVVV;

(gggg) Asphalt Processing and Roofing Manufacturing (Area Sources) — 40
C.F.R. Part 63, Subpart AAAAAA; and

(hhhh) Paints and Allied Products Manufacturing (Area Sources) — 40
C.F.R. Part 63, Subpart CCCCCC.

Appendix I

Solvent Management Plan

Introduction

1. This appendix to the annex on limit values for emissions of [non-methane volatile organic compounds (NMVOCs) – ~~delete~~] **VOCs** 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 – ~~delete~~] **VOCs** in waste gases;
 - O2. Organic solvents lost in water, if appropriate taking into account wastewater 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 wastewater [treatments – ~~delete~~], 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;

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 – ~~delete~~] VOCs. Emission of [NMVOCs – ~~delete~~] VOCs can be calculated by means of the following equation:

$$E = F + O1$$

Where F is the fugitive emission of [NMVOC – ~~delete~~] VOC 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 – ~~delete~~] VOCs for comparison with fugitive emission values in the annex:

(i) Methodology: The fugitive emission of [NMVOC – ~~delete~~] VOC 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:

$$I = I1 + I2;$$

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