Annex VI

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~~ **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:~~

(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.,
(vi)   wooden surfaces,
(vii)   textile, fabric, film, paper surfaces,
(viii) ~~and~~ leather ~~surfaces~~.

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~~.
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~~ **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;

Rotary screen printing: a web-fed printing ~~activity~~ **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: a 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~~ **process** equipment;

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

(p1)   "Organic compound" means any compound containing at least the element carbon and one or more of hydrogen, halogens, oxygen, sulphur, phosphorus, silicon or nitrogen, with the exception of carbon oxides and inorganic carbonates and bicarbonates;

(q)   "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;

(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**es**" 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;

(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:

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.~~
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.

(n)   "Wood impregnation" means any activity giving a loading of preservative in timber;

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

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

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

(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)   "**Emission** limit value" **(ELV)** means the maximum quantity of ~~a gaseous substance~~ **VOC (except methane)** ~~contained in the waste gases~~ **emitted** from an installation which is not to be exceeded during normal operation. ~~Unless otherwise specified~~**For the waste gases**, it ~~shall be calculated~~ **is expressed** in terms of mass of ~~pollutant~~ **VOC** per volume of the 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.~~ 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**es**. ~~Limit values generally address all volatile organic compounds except methane (no further distinction is made, e.g. in terms of reactivity or toxicity);~~

Emission limit values for waste gases are indicated as ELVc; Emission limit values for fugitive emissions are indicated as ELVf.

(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.

(z)   "Footwear manufacture" means any activity of producing complete footwear or part of it

(aa)   "Solvent consumption" means the total input of organic solvents into an installation per calendar year, or any other 12-month period, less any volatile organic compounds that are recovered for re-use

4.	The following requirements shall be satisfied

(a)	Emissions shall be monitored̶ in all cases **via measurements or through calculations achieving at least the same accuracy**. Compliance with **emission** limit values c̶a̶n̶ **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 s̶t̶a̶n̶d̶a̶r̶d̶s̶ **limit values** is achieved if the validated **daily** m̶o̶n̶t̶h̶l̶y̶ emission average does not exceed the **emission** limit values. In case of discontinuous measurements or other appropriate determination procedures, compliance with the emission **limit values** s̶t̶a̶n̶d̶a̶r̶d̶s̶ 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 c̶o̶n̶t̶i̶n̶u̶o̶u̶s̶ ̶a̶n̶d̶ d̶i̶s̶c̶o̶n̶t̶i̶n̶u̶o̶u̶s̶ measurement methods may be taken into account for verification purposes;̶**The fugitive and total emission limit values apply as annual averages.**

(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, 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 **emission** limit values s̶h̶o̶u̶l̶d̶ ̶b̶e̶ ̶a̶p̶p̶l̶i̶e̶d̶ **apply** for waste gases **containing substances harmful to human health**,̶ ̶u̶n̶l̶e̶s̶s̶ ̶s̶t̶a̶t̶e̶d̶ ̶o̶t̶h̶e̶r̶w̶i̶s̶e̶ ̶b̶e̶l̶o̶w̶:

(a)	20 mg s̶u̶b̶s̶t̶a̶n̶c̶e̶/Nm3 **(expressed as the mass sum of individual compounds)** for discharges of halogenated 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 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.	F̶o̶r̶ ̶t̶h̶e̶ ̶s̶o̶u̶r̶c̶e̶ ̶c̶a̶t̶e̶g̶o̶r̶i̶e̶s̶ ̶l̶i̶s̶t̶e̶d̶ ̶i̶n̶ ̶p̶a̶r̶a̶g̶r̶a̶p̶h̶s̶ ̶8̶ ̶t̶o̶ ̶2̶2̶ ̶b̶e̶l̶o̶w̶,̶ ̶t̶h̶e̶ ̶f̶o̶l̶l̶o̶w̶i̶n̶g̶ ̶r̶e̶v̶i̶s̶i̶o̶n̶s̶ ̶a̶r̶e̶ r̶e̶l̶e̶v̶a̶n̶t̶:̶

(̶a̶)̶	I̶n̶s̶t̶e̶a̶d̶ ̶o̶f̶ ̶a̶p̶p̶l̶y̶i̶n̶g̶ ̶t̶h̶e̶ ̶c̶a̶n̶a̶l̶i̶z̶e̶d̶ ̶a̶n̶d̶ ̶f̶u̶g̶i̶t̶i̶v̶e̶ ̶e̶m̶i̶s̶s̶i̶o̶n̶ ̶l̶i̶m̶i̶t̶ ̶v̶a̶l̶u̶e̶s̶ ̶(̶r̶e̶s̶p̶e̶c̶t̶i̶v̶e̶l̶y̶ ̶E̶L̶V̶c̶ ̶a̶n̶d̶ E̶L̶V̶f̶)̶,̶ ̶o̶p̶e̶r̶a̶t̶o̶r̶s̶ ̶m̶a̶y̶ ̶b̶e̶ ̶a̶l̶l̶o̶w̶e̶d̶ ̶t̶o̶ ̶c̶o̶m̶p̶l̶y̶ ̶w̶i̶t̶h̶ ̶t̶o̶t̶a̶l̶ ̶e̶m̶i̶s̶s̶i̶o̶n̶ ̶l̶i̶m̶i̶t̶ ̶v̶a̶l̶u̶e̶s̶2̶.̶ ̶T̶h̶e̶ ̶p̶u̶r̶p̶o̶s̶e̶ ̶i̶s̶ ̶t̶o̶ a̶l̶l̶o̶w̶ ̶t̶h̶e̶ ̶o̶p̶e̶r̶a̶t̶o̶r̶ ̶t̶h̶e̶ ̶p̶o̶s̶s̶i̶b̶i̶l̶i̶t̶y̶ ̶t̶o̶ ̶a̶c̶h̶i̶e̶v̶e̶ ̶b̶y̶ ̶o̶t̶h̶e̶r̶ ̶m̶e̶a̶n̶s̶ ̶e̶m̶i̶s̶s̶i̶o̶n̶ ̶r̶e̶d̶u̶c̶t̶i̶o̶n̶s̶,̶ ̶e̶q̶u̶i̶v̶a̶l̶e̶n̶t̶ ̶t̶o̶ t̶h̶o̶s̶e̶ ̶a̶c̶h̶i̶e̶v̶e̶d̶ ̶i̶f̶ ̶g̶i̶v̶e̶n̶ ̶l̶i̶m̶i̶t̶ ̶v̶a̶l̶u̶e̶s̶ ̶w̶e̶r̶e̶ ̶t̶o̶ ̶b̶e̶ ̶a̶p̶p̶l̶i̶e̶d̶;̶ ̶a̶n̶d̶

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[1]̶ ̶M̶o̶n̶i̶t̶o̶r̶i̶n̶g̶ ̶i̶s̶ ̶t̶o̶ ̶b̶e̶ ̶u̶n̶d̶e̶r̶s̶t̶o̶o̶d̶ ̶a̶s̶ ̶a̶n̶ ̶o̶v̶e̶r̶a̶l̶l̶ ̶a̶c̶t̶i̶v̶i̶t̶y̶,̶ ̶c̶o̶m̶p̶r̶i̶s̶i̶n̶g̶ ̶m̶e̶a̶s̶u̶r̶i̶n̶g̶ ̶o̶r̶ ̶c̶a̶l̶c̶u̶l̶a̶t̶i̶n̶g̶ ̶o̶f̶ ̶e̶m̶i̶s̶s̶i̶o̶n̶s̶,̶ ̶m̶a̶s̶s̶ b̶a̶l̶a̶n̶c̶i̶n̶g̶,̶ ̶e̶t̶c̶.̶ ̶I̶t̶ ̶c̶a̶n̶ ̶b̶e̶ ̶c̶a̶r̶r̶i̶e̶d̶ ̶o̶u̶t̶ ̶c̶o̶n̶t̶i̶n̶u̶o̶u̶s̶l̶y̶ ̶o̶r̶ ̶d̶i̶s̶c̶o̶n̶t̶i̶n̶u̶o̶u̶s̶l̶y̶.̶

[2]̶ ̶T̶o̶t̶a̶l̶ ̶e̶m̶i̶s̶s̶i̶o̶n̶ ̶l̶i̶m̶i̶t̶ ̶v̶a̶l̶u̶e̶s̶ ̶d̶e̶f̶i̶n̶e̶d̶ ̶i̶n̶ ̶t̶h̶i̶s̶ ̶a̶n̶n̶e̶x̶ ̶a̶r̶e̶ ̶c̶o̶n̶s̶i̶s̶t̶e̶n̶t̶ ̶w̶i̶t̶h̶ ̶t̶h̶e̶ ̶i̶m̶p̶l̶e̶m̶e̶n̶t̶a̶t̶i̶o̶n̶ ̶o̶f̶ ̶a̶ ̶r̶e̶d̶u̶c̶t̶i̶o̶n̶ ̶s̶c̶h̶e̶m̶e̶.̶

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

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 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, the operator must demonstrate**s** to the satisfaction of the competent authority that the best available technique**s are** 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 22 below.

8.   Storage and distribution of petrol:

Petrol storage installations at terminals, when above the threshold values mentioned in Table 1, must be either:
- **fixed-roof tanks, which are connected to a vapour recovery unit meeting the emission limit values set out in Table 1 or,**
- **designed with a floating roof, either external or internal, equipped with primary and secondary seals meeting the reduction efficiency set out in Table 1.**

As a derogation from the abovementioned 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 1~~	~~Option 2~~	~~Option 3~~
		ELV ~~in g/Nm³~~ or reduction efficiency ~~in % or ELV in % w/w~~		
Loading and unloading of mobile container at terminals	5000 m³ petrol throughput annually	~~As option 3~~	~~As option 3~~	10 g VOC/Nm³ including methane[a/]
Storage installations at terminals	Existing terminals or tank farms with a petrol throughput of 10000 t/year **or more** New terminals (without thresholds except for terminals located in small remote islands with a throughput less than 5000 tonnes/year)	~~98.5 %~~ ~~(compared to a fixed roof tank without measures)~~	~~97%~~ ~~(compared to a fixed roof tank without measures)~~	95 % [c/] ~~(compared to a fixed roof tank without measures)~~
Service stations	Petrol throughput larger than 100 m³/year	~~As option 3~~	~~As option 3~~	0.01 % w/w of the throughput[b/]

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/ 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.**

c/ 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

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

Threshold values	Option 1 [yearly average]	option 2 [yearly average]	option 3 [yearly average]
	Minimum vapour capture efficiency % w/w [a/]		
New service station if its actual or intended throughput is greater than 500 m³ per annum			
Existing service station if its actual or intended throughput is greater than 3,000 m³ 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)	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)	No ELVs
Existing service station if its actual or intended throughput is greater than 500 m³ 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	~~Suggested~~ ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	Option 1 [1/]	**Option 2** [1/]	**Option 3** [1/]
Footwear Manufacture (solvent consumption > 5 t/y)	~~As option 3~~	~~As option 3~~	$\underline{25\,^{a/}}$ g VOC / pair of shoes
Other adhesive coating, ~~except footwear; new and existing installations~~ solvent consumption **5- **15 t/y)	~~As option 3~~	~~As option 3~~	$\underline{ELVc = 50\ mg\,^{b/}\ C/Nm^3}$ $\underline{ELVf = 25\ \text{wt-}\%\ \text{or less of the solvent input}}$ Or total ELV of 1.2 kg or less of VOC/kg of solid input
Other adhesive coating, ~~except footwear; new and existing installations~~ solvent consumption 15– 200 tonnes/y)	~~ELVc = 50 mg~~ $^{d/}$ ~~C/Nm³~~ ~~ELVf = 10 wt-% or less of the solvent input~~ ~~Or total ELV of 0.6 kg or less of VOC/kg of solid input~~	~~ELVc = 50 mg~~ $^{c/}$ ~~C/Nm³~~ ~~ELVf = 15 wt-% or less of the solvent input~~ ~~Or total ELV of 0.8 kg or less of VOC/kg of solid input~~	$\underline{ELVc = 50\ mg\,^{b/}\ C/Nm^3}$ $\underline{ELVf = 20\ \text{wt-}\%\ \text{or less of the solvent input}}$ **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 > 200 tonnes/y)	~~ELVc = 50 mg~~ $^{d/}$ ~~C/Nm3~~ ~~ELVf = 10 wt-% or less of the solvent input Or total ELV of 0.6 kg or less of VOC/kg of solid input~~	$\underline{ELVc = 50\ mg\,^{c/}\ C/Nm3}$ $\underline{ELVf = 15\ \text{wt-}\%\ \text{or less of the solvent input}}$ Or total ELV of 0.8 kg or less of VOC/kg of solid input	~~ELVc = 50 mg~~ $^{b/}$ ~~C/Nm3~~ ~~ELVf = 20 wt-% or less of the solvent input Or total ELV of 1 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/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.

10.   Wood and plastic lamination:

Table 3: ~~VOC emission ELV~~ 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~~ (solvent consumption > 5 t/y)	Total ELV of 30 g VOC/m² of final product

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11.   Coating activities (vehicle coating industry):

Table 4: Limit values for coating activities in the vehicle industry

Activity and threshold	~~Suggested~~ ELV for VOC [yearly for total ELV]		
	Option 1 [a/ 1/]	**Option 2** [a/ 1/]	**Option 3** [a/ 1/]
Manufacture of cars (M1, M2) (solvent consumption > 15 tonnes/y and ≤ 5,000 coated items/y or > 3,500 chassis-built)	~~As option 3~~	~~As option 3~~	90 g VOC/m² or 1.5 kg/body + 70 g/m²
Manufacture of cars (M1, M2) (solvent consumption 15–200 tonnes/year and > 5,000 coated items/y)	~~25 g VOC/m² or 0.7 kg/body + 17 g/m²~~	~~35 g VOC/m² or 1 kg/body + 26 g/m²~~	*Existing installations*: 60 g VOC/m² or 1.9 kg/body + 41 g/m² *New installations*: 45 g VOC/m² or 1.3 kg/body + 33 g/m²
Manufacture of cars (M1, M2) (solvent consumption > 200 tonnes/year and > 5,000 coated items/y)	~~25 g VOC/m² or 0.7 kg/body + 17 g/m²~~	35 g VOC/m² or 1 kg/body + 26 g/m² [b/]	~~*Existing installations*: 60 g VOC/m² or 1.9 kg/body + 41 g/m²~~ ~~New installations: 45 g VOC/m² or 1.3 kg/body + 33 g/m²~~

Activity and threshold	~~Suggested~~ ELV for VOC [yearly for total ELV]		
	Option 1 [a/ 1/]	**Option 2** [a/ 1/]	**Option 3** [a/ 1/]
Manufacture of truck cabins (N1, N2, N3) (solvent consumption > 15 tonnes/y and ≤ 5,000 coated items/y)	~~As option 3~~	~~As option 3~~	*Existing installations*: 85 g VOC/m² / *New installations*: 65 g VOC/m²
Manufacture of truck cabins (N1, N2, N3) (solvent consumption 15 -200 tonnes/y and > 5,000 coated items/y)	~~35 g VOC/m²~~	~~55 g VOC/m²~~	*Existing installations*: 75 g VOC/m² / *New installations*: 55 g VOC/m²
Manufacture of truck cabins (N1, N2, N3) (solvent consumption > 200 tonnes/y and > 5,000 coated items/y)	~~35 g VOC/m²~~	55 g VOC/m²	~~Existing installations: 75 g VOC/m²~~ / ~~New installations: 55 g VOC/m²~~
Manufacture of trucks and vans (solvent consumption > 15 tonnes/y and ≤ 2,500 coated items/y)	~~As option 3~~	~~As option 3~~	*Existing installations*: 120 g VOC/m² / *New installations*: 90 g VOC/m²
Manufacture of trucks and vans (solvent consumption 15 – 200 tonnes/y and > 2,500 coated items/y)	~~35 g VOC/m²~~	~~50 g VOC/m²~~	*Existing installations*: 90 g VOC/m² / *New installations*: 70 g VOC/m²
Manufacture of trucks and vans (solvent consumption > 200 tonnes/y and > 2,500 coated items/y)	~~35 g VOC/m²~~	50 g VOC/m²	~~Existing installations: 90 g VOC/m²~~ / ~~New installations: 70 g VOC/m²~~

Activity and threshold	Suggested ELV for VOC [yearly for total ELV]		
	Option 1 [a/ 1/]	Option 2 [a/ 1/]	Option 3 [a/ 1/]
Manufacture of buses (solvent consumption > 15 tonnes/y and ≤ 2,000 coated items/y)	~~As option 3~~	~~As option 3~~	*Existing installations*: 290 g VOC/m²
			New installations: 210 g VOC/m²
Manufacture of buses (solvent consumption 15 -200 tonnes/y and > 2,000 coated items/y)	~~120 g VOC/m²~~	~~150 g VOC/m²~~	*Existing installations*: 225 g VOC/m²
			New installations: 150 g VOC/m²
Manufacture of buses (solvent consumption > 200 tonnes/y and > 2,000 coated items/y)	~~120 g VOC/m²~~	150 g VOC/m²	~~Existing installations: 225 g VOC/m²~~
			~~New installations: 150 g VOC/m²~~

a/ The total limit values are expressed in terms of mass of **organic** solvent (g) emitted in relation to the surface area of product (m^2). 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.

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 paintshop and requires significant capital investment.

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

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

Activity and threshold	Suggested ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	Option 1 [1/]	Option 2 [1/]	Option 3 [1/]

Activity and threshold	Suggested ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	Option 1 [1/]	Option 2 [1/]	Option 3 [1/]
New and existing installations: wood coating (solvent consumption 15 - 25 tonnes/y)	As option 3	As option 3	ELVc = 100 [a/] mg C/Nm^3 ELVf = 25 wt-% or less of the solvent input **Or** total ELV of 1.6 kg or less of VOC / kg of solid input
New and existing installations: wood coating (solvent consumption 25-200 tonnes/y)	ELVc = 50 mg C/Nm3 for drying and 75 mg C/Nm3 for coating ELVf = 10 wt-% or less of the solvent input Or total ELV of 0.50 kg or less of VOC / kg of solid input	ELVc = 50 mg C/Nm3 for drying and 75 mg C/Nm3 for coating ELVf = 15 wt-% or less of the solvent input Or 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 **Or** total ELV of 1 kg or less of VOC / kg of solid input
New and existing installations: wood coating (solvent consumption >200 tonnes/y)	ELVc = 50 mg C/Nm3 for drying and 75 mg C/Nm3 for coating ELVf = 10 wt-% or less of the solvent input Or total ELV of 0.50 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 = 15 wt-% or less of the solvent input **Or** total ELV of 0.75 kg or less of VOC / kg of solid input	ELVc = 50 mg C/Nm3 for drying and 75 mg C/Nm3 for coating ELVf = 20 wt-% or less of the solvent input Or total ELV of 1 kg or less of VOC / kg of solid input
New and existing installations: coating of metal and plastics, (solvent consumption 5 - 15 tonnes/y)	As option 3	As option 3	ELVc = 100 [a/ b/] mg C/Nm^3 ELVf = 20 **25** [b/] wt-% or less of the solvent input **Or** total ELV of 0.525 **0.6** kg or less of VOC / kg of

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Activity and threshold	Suggested ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	Option 1 [1]	Option 2 [1]	Option 3 [1]
			solid input
~~New and existing installations:~~ other coating, incl. textile, fabric, ~~foil~~ **film** and paper (excl. web screen printing for textiles, see printing) (solvent consumption 5 - 15 tonnes/y)	~~As option 3~~	~~As option 3~~	$ELVc = 100$ [a/b/] mg C/Nm^3 $ELVf =$ ~~20~~ **25** [b/] wt-% or less of the solvent input **Or** total ELV of ~~1.4~~ **1.6** kg or less of VOC / kg of solid input
~~New and existing installations:~~ textile, fabric, ~~foil~~ **film** and paper coating, incl. (excl. web screen printing for textiles, see printing) (solvent consumption > 15 tonnes/y)	~~As option 3~~	~~As option 3~~	$ELVc = 50$ 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 **Or** total ELV of 1 kg or less of VOC / kg of solid input
~~New and existing installations:~~ coating of plastic workpieces (solvent consumption 15 - 200 tonnes/y)	~~ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating~~ [b/] ~~ELVf = 10~~ [b/] ~~wt-% or less of the solvent input~~ ~~Or total ELV of 0.225 kg or less of VOC / kg of solid input~~	~~ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating~~ [b/] ~~ELVf = 15~~ [b/] ~~wt-% or less of the solvent input~~ ~~Or total ELV of 0.30 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 [b/] $ELVf = 20$ [b/] wt-% or less of the solvent input **Or** total ELV of 0.375 kg or less of VOC / kg of solid input
~~New and existing installations:~~ coating of plastic workpieces (solvent	~~ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating~~ [b/]	$ELVc = 50$ mg C/Nm^3 for drying and 75 mg C/Nm^3 for coating [b/]	~~ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating~~ [b/]

Activity and threshold	Suggested ~~Suggested~~ ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	Option 1 [1]	Option 2 [1]	Option 3 [1]
consumption > 200 tonnes/y)	~~ELVf = 10 [b] wt-% or less of the solvent input~~ ~~**Or** total ELV of 0.225 kg or less of VOC / kg of solid input~~	ELVf = ~~15~~ **20** [b] wt-% or less of the solvent input **Or** total ELV of ~~0.30~~ **0.35** kg or less of VOC / kg of solid input	~~ELVf = 20 [b] wt-% or less of the solvent input~~ ~~**Or** total ELV of 0.375 kg or less of VOC / kg of solid input~~
~~New and existing installations:~~ coating of metal surfaces (solvent consumption 15 - 200 tonnes/y)	~~ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating [b]~~ ~~ELVf = 10 [b] wt-% or less of the solvent input~~ ~~**Or** total ELV of 0.225 kg or less of VOC / kg of solid input~~	~~ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating [b]~~ ~~ELVf = 15 [b] wt-% or less of the solvent input~~ ~~**Or** total ELV of 0.30 kg or less of VOC / kg of solid input~~	ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating [b] ELVf = 20 [b] wt-% or less of the solvent input **Or** total ELV of 0.375 kg or less of VOC / kg of solid input
	~~As option 3~~	~~As option 3~~	**Exception for coatings in contact with food:** Total ELV of 0.5825 kg or less of VOC / kg of solid input
~~New and existing installations:~~ coating of metal surfaces (solvent consumption >200 tonnes/y)	~~ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating [b]~~ ~~ELVf = 10 [b] wt-% or less of the solvent input~~ ~~**Or** total ELV of 0.225 kg or less of VOC / kg of solid input~~	ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating [b] ELVf = ~~15~~ **20** [b] wt-% or less of the solvent input **Or** total ELV of ~~0.30~~ **0.33** kg or less of VOC / kg of solid input	~~ELVc = 50 mg C/Nm³ for drying and 75 mg C/Nm³ for coating [b]~~ ~~ELVf = 20 [b] wt-% or less of the solvent input~~ ~~**Or** total ELV of 0.375 kg or less of VOC / kg of solid input~~

Activity and threshold	Suggested ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	Option 1 [1]	Option 2 [1]	Option 3 [1]
	As option 3	As option 3	**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/Nm^3 for drying and coating together.

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

Table 6: Limit values for VOC 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: leather coating **in furnishing and particular leather goods used as small consumer goods like bags, belts, wallets, etc.** (solvent consumption > 10 tonnes/y)	Total ELV of 150 g/m² [a/]
New and existing installations: **Other** leather coating (solvent consumption 10 - 25 tonnes/y)	Total ELV of 85 g/m²
New and existing installations: **Other** leather coating (solvent consumption > 25 tonnes/y)	Total ELV of 75 g/m²

Activity and threshold	ELV for VOC [yearly for total ELV]
	Option 1,2 and 3[/]
~~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:

Table 7: Limit values for coil coating

Activity and threshold	ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	Option 1 [1/]	**Option 2 [1/]**	**Option 3 [1/]**
Existing installation (solvent consumption 25 -200 tonnes/y)	~~ELVc = 30mg [e/] C/Nm³~~ ~~ELVf = 5 wt % or less of the solvent input~~ ~~**Or** total ELV of 0.225 kg or less of VOC/kg of solid input~~	~~ELVc = 50 mg [b/] C/Nm³~~ ~~ELVf = 5 wt % or less of the solvent input~~ ~~**Or** total ELV of 0.3 kg or less of VOC/kg of solid input~~	ELVc = 50mg [a/] C/Nm³ ELVf = 10 wt-% or less of the solvent input **Or** total ELV of 0.45 kg or less of VOC/kg of solid input
Existing installation (solvent consumption > 200 tonnes/y)	~~ELVc = 30mg [e/] C/Nm³~~ ~~ELVf = 5 wt % or less of the solvent input~~ ~~**Or** total ELV of 0.225 kg or less of VOC/kg of solid input~~	~~ELVc = 50 mg [b/] C/Nm³~~ ~~ELVf = 5 wt % or less of the solvent input~~ ~~**Or** total ELV of 0.3 kg or less of VOC/kg of solid input~~	ELVc = 50mg [a/] C/Nm³ ELVf = 10 wt-% or less of the solvent input **Or** total ELV of 0.45 kg or less of VOC/kg of solid input
New installation (solvent consumption 25	~~ELVc = 30mg [e/] C/Nm³~~ ~~ELVf = 3 wt % or less of~~	~~ELVc = 30mg [b/] C/Nm³~~ ~~ELVf = 5 wt % or less~~	ELVc = 50 mg C/Nm³ [a/] ELVf = 5 wt-% or less

– 200 tonnes/y)	~~the solvent input~~ ~~**Or** total ELV of 0.15 kg or less of VOC/kg of solid input~~	~~of the solvent input~~ ~~**Or** total ELV of 0.18 kg or less of VOC/kg of solid input~~	of the solvent input **Or** total ELV of 0.3 kg or less of VOC/kg of solid input
New installation (solvent consumption > 200 tonnes/y)	~~$ELVc = 30mg^{c/} C/Nm^3$~~ ~~$ELVf = 3$ wt-% or less of the solvent input~~ ~~**Or** total ELV of 0.15 kg or less of VOC/kg of solid input~~	~~$ELVc = 30mg^{b/} C/Nm^3$~~ ~~$ELVf = 5$ wt-% or less of the solvent input~~ ~~**Or** total ELV of 0.18 kg or less of VOC/kg of solid input~~	$ELVc = 50$ mg $^{a/}$ C/Nm^3 $ELVf = 5$ wt-% or less of the solvent input **Or** 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/Nm^3.
~~b/ If techniques are used which allow reuse of recovered solvent, the limit value shall be 100 mg C/Nm^3.~~
~~c/ If techniques are used which allow reuse of recovered solvent, the limit value shall be 75 mg C/Nm^3.~~

15.   Dry cleaning:

Table 8: Limit values for dry cleaning

Activity ~~and threshold~~	ELV for VOC [a/ b/] [yearly for total ELV]		
	Option1[1/]	Option2[1/]	Option3
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)[a/]~~		~~Total ELV of 20 g VOC/kg (mass of cleaned and dried product)[a]~~

a/ Limit value for total emissions of VOCs calculated as mass of emitted ~~solvent~~ **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 for manufacturing of coatings, varnishes, inks and adhesives

Activity and threshold	~~Suggested~~ ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	~~Option 1 [1/]~~	~~Options 2 [1/]~~	~~Option 3 [1/]~~
New and existing installations with a~~n annual organic~~ solvent consumption between 100 and 1000 tonnes/y	~~Total ELV of 3 wt-% of solvent input~~		ELVc = 150mg C/Nm^3 ELVf $^{a/}$ = 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 a~~n annual organic~~ solvent consumption > 1000 tonnes/y	~~Total ELV of 1 wt-% of solvent input~~	~~Total ELV of 2 wt-% of solvent input~~	ELVc = 150mg C/Nm^3 ELVf $^{a/}$ = 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.

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

Table 10: Limit values for printing activities

Activity and threshold	~~Suggested~~ ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	Option 1 [1]	Option 2 [1]	Option 3 [1]
Heatset offset (solvent consumption 15 – 25 tonnes/y)	~~As option 3~~	~~As option 3~~	ELVc = 100 mg C/Nm^3 ELVf = 30 wt-% or less of the solvent input [a]
Heatset offset (solvent consumption 25 – 200 tonnes/y)	~~For new and upgraded presses~~		New and existing installations
	~~Total ELV = 5 wt-% or less of the ink consumption a/~~	~~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]
	~~For existing presses~~		
	~~Total ELV = 10 wt-% or less of the ink consumption a/~~	~~Total ELV = 15 wt-% or less of the ink consumption a/~~	
Heatset offset (solvent consumption >200 tonnes/y)	For new and upgraded presses		New and existing installations
	~~Total ELV = 5 wt-% or less of the ink consumption~~ [a]	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/~~
	For existing presses		
	~~Total ELV = 10 wt-% or less of the ink consumption~~ [a]	Total ELV = 15 wt-% or less of the ink consumption [a]	

Activity and threshold	Suggested ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	Option 1 [1/]	Option 2 [1/]	Option 3 [1/]
Publication gravure (solvent consumption 25 -200 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^3 ELVf = 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^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
Publication gravure (solvent consumption >200 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/Nm³~~ ~~ELVf = 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		

Activity and threshold	Suggested ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	Option 1 [1/]	**Option 2** [1/]	**Option 3** [1/]
	~~Total ELV = 5 wt-% or less of the solvent input~~	Total ELV = 7 wt-% or less of the solvent input	~~ELVc = 75 mg C/Nm³~~ ~~ELVf = 15 wt-% or less of the solvent input~~ ~~**Or** total ELV of 0.8 kg or less of VOC/kg of solid input~~
Packaging rotogravure and flexography (solvent consumption 15 – 25 tonnes/y)	~~As option 3~~	~~As option 3~~	ELVc = 100 mg C/Nm³ ELVf = 25 wt-% or less of the solvent input **Or** total ELV of 1.2 kg or less of VOC/kg of solid input
Packaging rotogravure and flexography (solvent consumption 25 - 200 tonnes/y) and rotary screen printing (solvent consumption > 30 tonnes/y)	~~As option 3~~	~~As option 3~~	ELVc = 100 mg C/Nm³ ELVf = 20 wt-% or less of the solvent input **Or** total ELV of 1.0 kg or less of VOC/kg of solid input

Activity and threshold	~~Suggested~~ ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	Option 1 [1]	**Option 2** [1]	**Option 3** [1]
Packaging rotogravure and flexography (solvent consumption > 200 tonnes/y)	**For plants with all machines connected to oxidation:** Total ELV = ~~10% of the reference emission b/~~ **0.5 kg VOC/kg of solid input** **For plants with all machines connected to carbon adsorption:** Total ELV = ~~12.5% of the reference emission b/~~ **0.6 kg VOC/kg of solid input** **For existing mixed plants where some existing machines may not be attached to an incinerator or solvent recovery:** Emissions from *the machines connected* to oxidisers or carbon adsorption are below the emission limits of ~~10% or 12.5%~~ **0.5 or 0.6 kg VOC/kg of solid input** respectively. *For machines not connected* to gas treatment: 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. 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/)~~		~~ELVc = 100 mg C/Nm³~~ ~~ELVf = 20 wt % or less of the solvent input~~ ~~Or total ELV = 25% of reference emission b/~~

a/ Residual solvent in the finished product are 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~~ ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]					
	Options 1 [1]		Option 2 [1]		Option 3 [1]	
New installations (solvent consumption > 50 tonnes/y)	~~ELVc: For non-oxidating techniques : 0.1 kg C/hour[f] or 20 mg C/Nm³ [g] [d] for thermal oxidation/incineration or catalytic oxidation < 0.05 kg C/hour or < 5 mg C/ Nm³ [g] [e]~~	~~ELVf = 3 wt-% or less of the solvent input [d]~~	~~ELVc: For non-oxidating techniques : 0.1 kg C/hour[f] or 20 mg C/Nm³ [g] [d] for thermal oxidation/incineration or catalytic oxidation < 0.05 kg C/hour or < 5 mg C/ Nm³ [g] [e]~~	~~ELVf = 3 wt-% or less of the solvent input [d]~~	ELVc = 20 mg C/Nm³ [a] [b]	ELVf = 5 wt-% or less of the solvent input [b]
Existing installations (solvent consumption > 50 tonnes/y)		~~ELVf = 5 wt-% or less of the solvent input [e]~~		~~ELVf = 5 wt-% or less of the solvent input [e]~~	ELVc = 20 mg C/Nm³ [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.~~
~~e/ A total limit value of 5 % of solvent input may be applied instead of applying ELVc and ELVf.~~
~~f/ The averaging time relates to the emission profile, the levels relate to dry gas and Nm³~~
~~g/ The concentration level relates to volume flows without dilution by, e.g. volume flows from room or building ventilation~~

19.   Conversion of natural or synthetic rubber:

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

Activity and threshold	Suggested ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]
	Options 1, 2 and 3 [1]
New and existing installations: conversion of natural or synthetic rubber (solvent consumption >	ELVc = 20 [a]

15 tonnes/y)	$\underline{ELVf = 25}$ [b/]
	$\underline{\textbf{Or} \text{ total ELV} = 25\% \text{ of solvent input}}$

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

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~~tonnes/year)	ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]			
		Options 1 and 2 [1/]		Option 3 [1/]	
~~New and existing installations:~~ surface cleaning using substances mentioned in paragraph 3 y (i) of this annex	1 - 5	~~ELVc = 10 mg compound/Nm^3~~	~~ELVf = 1% of solvent input~~	$\underline{ELVc = 20 \text{ mg compound/Nm}^3}$	$\underline{ELVf = 15\% \text{ of solvent input}}$
	> 5	~~ELVc = 10 mg compound/Nm^3~~	~~ELVf = 0.5 % of solvent input~~	$\underline{ELVc = 20 \text{ mg compound/Nm}^3}$	$\underline{ELVf = 10\% \text{ of solvent input}}$
~~New and existing installations:~~ other surface cleaning	2 - 10	~~As option 3~~	~~As option 3~~	$\underline{ELVc = 75 \text{ mg C/Nm}^{3 \text{ a/}}}$	$\underline{ELVf = 20 \%}$ [a/] $\underline{\text{of solvent input}}$
	> 10	~~As option 3~~	~~As option 3~~	$\underline{ELVc = 75 \text{ mg C/Nm}^{3 \text{ a/}}}$	$\underline{ELVf = 15 \%}$ [a/] $\underline{\text{of solvent input}}$

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 [1]
New and existing installations (solvent consumption > 10 tonnes/y)	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, excl. 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~~.
b/ The removal of gum from the oil.

22.   Impregnation of woo~~den surfaces~~:

Table 15: Limit values for impregnation of woo~~den surfaces~~

Activity and threshold	ELV for VOC [daily for ELVc and yearly for ELVf and total ELV]		
	~~Option 1~~ [1]	~~Option 2~~ [1]	Option 3 [1]
Wood ~~preservation~~ **impregnation** (solvent consumption 25 - 200 tonnes/y)	~~ELVc = 100[a] mg C/Nm³~~ ~~ELVf = 25 wt-% or less of the solvent input~~ ~~Or 7 kg or less of VOC / m³~~	~~ELVc = 100[a] mg C/Nm³~~ ~~ELVf = 35 wt-% or less of the solvent input~~ ~~Or 9 kg or less of VOC / m³~~	ELVc = 100 [a] mg C/Nm³ ELVf = 45 wt-% or less of the solvent input **Or** 11 kg or less of VOC / m³
Wood ~~preservation~~ **impregnation**	~~ELVc = 100[a] mg C/Nm³~~ ~~ELVf = 25 wt-% or less~~	ELVc = 100 [a] mg C/Nm³ ELVf = 35 wt-% or less of	~~ELVc = 100[a] mg C/Nm³~~ ~~ELVf = 45 wt-% or less of~~

(solvent consumption > 200 tonnes/y)	of the solvent input Or 7 kg or less of VOC / m³	the solvent input Or 9 kg or less of VOC / m³	the solvent input Or 11 kg or less of VOC / m³

a/ Does not apply to impregnation with creosote

Appendix I

SOLVENT MANAGEMENT PLAN

Introduction

1.   *This appendix to the annex on limit values for emissions of ~~non-methane~~ volatile organic compounds (~~NM~~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 ~~NM~~VOCs 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.

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 ~~NM~~VOCs. Emission of ~~NM~~VOCs can be calculated by means of the following equation:
E = F + O1

Where F is the fugitive emission of ~~NM~~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 ~~NM~~VOCs for comparison with fugitive emission values in the annex:

(i)   Methodology: The fugitive emission of ~~NM~~VOCcan 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 ~~NM~~VOCs can be determined by a short but comprehensive set of measurements. This need not to be done again until the equipment is modified.