

## “Legislation on solvent emissions in flexographic industry explained for the flexo: Directive 2010/75/EU”

The Directive 2010/75/EU of 24 November 2010 is in force on the industrial emissions. The Flexographic industry is mentioned as Activity 3 in the table on page 334/80 of the Directive as one of 20 activities.

Link to the Directive 2010/75/EU in all EU languages:

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32010L0075>

The emission limit values in waste gases shall be calculated at a temperature of 273,15 K, and a pressure of 101,3 kPa.

	Activity (solvent consumption threshold in tonnes/year)	Threshold (solvent consumption threshold in tonnes/year)	Emission limit values in waste gases (mg C/Nm <sup>3</sup> )	Fugitive emission limit values (percentage of solvent input)		Total emission limit values		Special provisions
				New installations	Existing installations	New installations	Existing installations	
1	Heatset web offset printing (> 15)	15—25 > 25	100 20		30 (1) 30 (1)			(1) Solvent residue in finished product is not to be considered as part of fugitive emissions.
2	Publication rotogravure (> 25)		75	10	15			
3	Other rotogravure, flexography, rotary screen printing, laminating or varnishing units (> 15) rotary screen printing on textile/cardboard (> 30)	15—25 > 25 > 30 (1)	100 100 100		25 20 20			(1) Threshold for rotary screen printing on textile and on cardboard
4	Surface cleaning using compounds speci-	1—5	20 (1)		15			(1) Limit value refers to mass of compounds

The threshold is 15 ton solvent in the emission per year. This means that if a factory emits more than 15 ton of solvents per year the company needs to meet the emission restrictions in the directive. For the flexographic industry it is set that between 15 and 25 ton the fugitive emissions is allowed to be 25% of the total solvent input. Above 25 ton the fugitive emission is allowed to be 20%.

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## When is the company in compliance with the legislation?

The company can choose between “a” or “b” following **Article 59**:

**OR:**

- a Comply to the emission limits as seen in the table on page 334/80 (see below insert) which is 100 mgC/Nm<sup>3</sup> in the air emission of the factory plus the fugitive emissions

**OR:**

- b Comply to the rules of the reduction scheme as set out in Part 5 of Annex VII



*Note: Most of the time the option “b” gives the companies a better/lower cost option to comply with the legislation.*

One is not better for the environment than the other. In “b” the company is allowed to emit as much solvents as in “a”. The calculation is just different. In “b” you can calculate with the *real* fugitive emissions. In “a” the company is allowed to emit 20%, while normally a flexo company has fugitive emissions of about 2,5%.

### Article 59

#### Control of emissions

1. Member States shall take the necessary measures to ensure that each installation complies with either of the following:

- (a) the emission of volatile organic compounds from installations shall not exceed the emission limit values in waste gases and the fugitive emission limit values, or the total emission limit values, and other requirements laid down in Parts 2 and 3 of Annex VII are complied with;
- (b) the requirements of the reduction scheme set out in Part 5 of Annex VII provided that an equivalent emission reduction is achieved compared to that achieved through the application of the emission limit values referred to in point (a).

Member States shall report to the Commission in accordance with Article 72(1) on the progress in achieving the equivalent emission reduction referred to in point (b).

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### *The “Reduction Scheme” as part of option “b”*

See page 334/85: in the Reduction Scheme a “target emission” is calculated. When the actual emission is lower than the target emission the company is in compliance with the solvent emission directive.

EN	Official Journal of the European Union	L 334/85
<p>2. For emissions of halogenated volatile organic compounds which are assigned or need to carry the hazard statements H341 or H351, where the mass flow of the sum of the compounds causing the hazard statements H341 or H351 is greater than, or equal to, 100 g/h, an emission limit value of 20 mg/Nm<sup>3</sup> shall be complied with. The emission limit value refers to the mass sum of the individual compounds.</p>		
<p><b>PART 5</b></p> <p><b>Reduction scheme</b></p>		
<p>1. The operator may use any reduction scheme, specially designed for his installation.</p>		
<p>2. In the case of applying coatings, varnishes, adhesives or inks, the following scheme can be used. Where the following method is inappropriate, the competent authority may allow an operator to apply any alternative scheme achieving equivalent emission reductions to those achieved if the emission limit values of Parts 2 and 3 were to be applied. The design of the scheme shall take into account the following facts:</p>		
<p>(a) where substitutes containing little or no solvent are still under development, a time extension shall be given to the operator to implement his emission reduction plans;</p>		
<p>(b) the reference point for emission reductions should correspond as closely as possible to the emissions which would have resulted had no reduction action been taken.</p>		

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Activity	Multiplication factor for use in item (a)(ii)
Rotogravure printing; flexography printing; laminating as part of a printing activity; varnishing as part of a printing activity; wood coating; coating of textiles, fabric film or paper; adhesive coating	4
Coil coating, vehicle refinishing	3
Food contact coating, aerospace coatings	2,33
Other coatings and rotary screen printing	1,5

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

- (i) (the fugitive emission limit value + 15), for installations falling within item 6 and the lower threshold band of items 8 and 10 of Part 2,
- (ii) (the fugitive emission limit value + 5) for all other installations.

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

3. The following scheme shall operate for installations for which a constant solid content of product can be assumed:

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

- (i) The total mass of solids in the quantity of coating and/or ink, varnish or adhesive consumed in a year is determined. Solids are all materials in coatings, inks, varnishes and adhesives that become solid once the water or the volatile organic compounds are evaporated.
- (ii) The annual reference emissions are calculated by multiplying the mass determined in (i) by the appropriate factor listed in the table below. Competent authorities may adjust these factors for individual installations to reflect documented increased efficiency in the use of solids.

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## Examples

Let us give you a simple example: when you would like a more specific calculation based on the calculation method described on page 334/85 we need more details from your solvent management plan. You can find the requirements for the solvent management plan on page 344/86 of the same directive in part 7 of the annex VII. Every company has to make yearly a solvent management plan according to the same directive.

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*Important: also the solids in waterbased inks and laminates should be taken into account. It is even possible to count the solids that comes into the factory with pre-printed white film.*

Basically it comes down to the following:

**the amount of solids in ton/year equals the allowable (or target) solvent emission**

## Calculation

Say the company has the following characteristics:

- Yearly consumption of solvent based inks: 100 ton (e.g. 50% solvents & 50% solids);
- Yearly consumption of water based varnish: 50 ton (e.g. 50% water & 50% solids);
- Yearly solvents used for dilution, retardant etc: 200 ton.
  
- Total amount of solids:  $50 + 25 = 75$  ton/year
- Total amount of solvents:  $50 + 200 = 250$  ton
- Allowable/Target emission = Total solids in the factory
- Allowable/Target emission = 75 ton/year
- Necessary removal of solvents = 175 ton/year (or 70%)

**And why is option “b” sometimes better in the flexo industry?**

RTO's (also called incinerators) can easily reach  $< 100$  mgC/Nm<sup>3</sup>. Why go through “all the trouble” of going to option “b” with the reduction plan?

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Here is why:

For the flexo there are more options that can be used for the solvent emissions.

Everybody knows that RTO's have the following disadvantages:

1. When the solvent concentration in the factory air emission is low (a lot of) additional fuel is necessary to keep the incinerator burning.
  - a. This cost a lot of money
  - b. It is not sustainable to burn fossil fuels for the treatment of solvents in 2020
2. When the solvent concentration is high the use of fossil fuels is lower of course
  - a. Why burn the solvents when they can be reused. Destroying the solvents is not sustainable in 2020.
  - b. Still the costs of an incinerator is high, why not install a technology that is reducing your carbon footprint and saves the flexo company money?

#### Pure infinity: the green solution

1. VOCUS:
  - a. Lower solvent emissions 25-100 ton/year
  - b. Biological process → very very low running costs
  - c. Green and proven technology
2. BONCUS:
  - a. Solvent recovery by converting into green energy
  - b. By utilizing the energy the BONCUS gives a return on the investment
  - c. Imagine to run the factory on energy recovered from the waste air emission
  - d. Full green image due to sustainable technology
  - e. Make money by not-destroying valuable raw materials (no-waste)

Pure Infinity can assist on all of the above. Please contact us for more information.

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