IED Annex VII Part 1 No 3c and Part 5: Wood Coating

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DIRECTIVES

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on industrial emissions (integrated pollution prevention and control)

(Recast)

(Text with EEA relevance)

CHAPTER V

SPECIAL PROVISIONS FOR INSTALLATIONS AND ACTIVITIES USING ORGANIC SOLVENTS

Case study with detailed explanations especially to reduction schemes: Coating of wood

Situation:

- One operator
- Coating in two installations:
  - Annual solvent consumption: **24.000 kg**
  - No VOC exhaust gas abatement technique

Requirements:

1. Step:

Is an environmental permit necessary for the installation?

In Germany: Yes, solvent consumption > 15 tons/year (Nr. 5.1.1.2 of Annex 1 of 4. BImSchV):

2. Step: Activities according to Annex VII Part II IED?

Yes.

No. 10 of Annex VII Part 2: Wood coating

3. Step: Does the activity fall under the scope of Chapter V IED (Annex VII Part 2) because of the exceedance of solvent consumption threshold?

Yes; solvent consumption >> threshold of 15 tons/year

-> Installation No. 10 Annex VII Part 2 IED

Remark:

- Cleaning of equipment is considered to the activity in each case, here No. 10 Wood Coating

Compliance with the requirements of § 4 of 31. BImSchV (German VOC Ordinance 31. BImSchV)

Alternative 1:
Compliance with emission limit values of Annex III

Alternative 2:
Application of a reduction scheme

Specific reduction scheme (Annex IV A):

- Possible for all installations
- A Verification of the operator is necessary that an equivalent emission reduction is achieved as applying to Annex III

Reduction scheme for coating installations (Annex IV B):

- For installations with a constant solid content of product
  Here: Installations No. 8.1!
- No verification over equivalence is necessary

Simplified Verification (Appendix IV section C):

- For small installations (< 15 t/y solvent consumption)
- No verification over equivalence is necessary

Requirements according Annex VII Part 2 No 10 IED:

Blue: German VOC ordinance

Threshold [t/year]	Emission limit value waste gas [mg C/m³]	Emission limit value fugitive emission [% of solvent input]	Special provisions
> 15 - 25 > 25	100 (1) 50 (1); 75 (2)	25 (3) 20 (3)	3) VOC in captured untreated exhaust gas = fugitive emission

1) Emission limit value applies to coating application and drying processes operated under contained conditions

2) The first value applies to drying processes, the second to coating application processes

Reduction scheme according to Annex VII Part 5 for coating installations

Solvent consumption [t/a]	Multiplication factor for calculating the reference emissions	Percentage for calculation of the target emissions
Other coating		
> 5	4	(25 + 15)%
> 15 – 25	4 (3)	(25 + 15)%
> 25	4 (3)	(20 + 5)%

Blue: German VOC ordinance

Case study: Coating of wood

- 2-layer-application: clear-coat + top-coat
- No exhaust abatement technique
- Assumption: solvents will be emitted completely out of the coating
- The installation falls into the scope of the Chapter V IED because exceeding solvent consumption threshold

Material	*Consump-tion [kg]*	*VOC-content [%]*	*[kg]*	*Content solids [%]*	*[kg]*
Manual operated cleaning	3000	100	3 000	0	0
Clear-coat	20 000	80	16 000	20	4 000
Top-coat	10 000	50	5 000	50	5 000
Total			*24 000*		*9 000*

Solvent mass balance:

I1	**Purchased solvent and put in**	**24 000 kg**
I2	**Recovered and reused solvent in the installation**	**0 (no solvent recovery)**
O1.1	**Captured treated waste gas emissions**	**0 (air of the hall = fugitive emission)**
O1.2	**Captured untreated waste gas emissions**	**0 (air of the hall = fugitive emission)**
O2	**Solvent in waste water**	**Here neglected**
O3	**Solvent in product**	**Here neglected**
O4	**Uncaptured emissions**	**Calculation**

Solvent management plan:

O5	Destroyed solvent by an exhaust gas abatement unit	Not applicable, because no abatement unit for waste gas or waste water
O6	Solvent in waste	3 200 kg/y
O7	Solvent in products to be sold	Not applicable
O8	Recovered solvent but not as input into the process	Not applicable
O9	Solvent released in other ways	0

Determination of the solvent consumption:

LV = I1 – O8 = 24 000 kg – 0 kg = 24 000 kg

-> Installation No 10 of Annex VII Part 2 IED

Calculation of the fugitive emissions according Annex VII Part 7:

F = I1- O1.1 – O5 – O6 – O7 – O8 = 24 000 kg – 0 – 0 – 3 200 kg/a – 0 - 0 = 20 800 kg/a

Calculation of the total emissions:

E = F + O1.1 = 20 800 kg/a + 0 = 20 800 kg/a

Alternatives: Installation of an exhaust gas abatement unit or using a reduction scheme

Reduction scheme according to Annex VII Part 5 coating installations:

Reference emissions: 9 000 kg solids/year * 4 (Multiplication factor) =

36.000 kg/year (Germany: 9 000 kg * **3 = 27.000 kg/year**

Target emission = Reference emission * percentage =

36.000 kg/year * (25 + 15)% = 14.400 kg/year (**10.800** kg/year)

Following total emissions may not be exceeded:

Target emission = 14.400 kg/year **(10.000 kg/year)**

Result:

Emission reduction measures are necessary to comply to the target emission

In comparison: current total emissions 20 800 kg/year!

„Simplified Verification“ for small installation without environmental authorisation = Section C Annex IV 31. BImSchV

Idea of Usage of a Simplified Verification Scheme

- **Designed for coating installations applying to specific reduction scheme (Annex VII, Part 5, No 2 of IE Directive (former VOC Directive))**
- **Simplification of verification of compliance for small installations = generally coating installations not requiring an environmental permit = solvent consumption < 15 tons / year (required permission according to German law)**
- **Idea: Application of materials with a low solvent content where compliance to target values is guaranteed**

„Simplified Verification“ for small installation without environmental authorisation = Section C Annex IV 31. BImSchV

- Input of coatings with limited VOC content value:

  The best and cheapest way to comply with the requirements of the 31. BImSchV
- Lowest effort for operators and authorities
- No annual solvent mass balance necessary
- No verification necessary
- Usage limited to small installations where no authorisation is necessary

- Qualified operational documentation necessary over type and quantity of inputs with VOC content value; deposition of these documents near the installation at least 5 years

- The VOC content limits relate to the individual useable coating material (no sum parameter or average over all coating materials)

Low solvent content

Mass content of VOC:

e.g. weight percentage of VOC in a ready to use product

VOC "value"=

- **Mass of VOC expressed in grams/litre [g/l] in the formulation of the product in its ready to use condition**
  That means: VOC ratio is referred to coating volume without water
- **Determination referring on ISO 11890-1 and 2**
- **VOC content [g/l] = (mass volatile parts – mass of water)/(volume coating substance – volume water)**
- **See Deco Paint Ordinance 2004/42/EC of 21.04.2004**

VOC "values" apply **solely** to

(a) ready to use coatings and

(b) individual coatings or substances

They are **not** to be interpreted as composite parameters for all substances used.

Simplified verification for installations No 9.1 “coating of wood with solvent consumption < 15 t/year”:

a) Coating of plane parts: Exclusive coatings with a VOC content value ≤

250 g/l,

b) Coating of other surfaces: Exclusive coating with a VOC content value ≤

450 g/l

and

c) Water based woodstains with a VOC content value ≤ **300 g/l**

Example: Substitution of a solvent borne woodstain by a water based woodstain:

VOC content solvent borne woodstain:

Content of solids 5 weight% (= non-fugitive parts nfa), part of solvent 95 weight%, density (ρ_s): 0.9 g/cm^3, part of the mass of water in % (m_w): 0

VOC value (g/l) = (100 – nfa – m_w)*ρ_s*10 =

(100 – 5 –0)*0.9*10= 855 g/l

VOC content water borne woodstain:

Content of solids 5 weight% (= non-fugitive parts nfa), parts of solvent 25 weight%, density (ρ_s): 1.0 g/cm^3, content of water in % (m_w): 70

VOC value (g/l) = (100 – nfa – m_w)*ρ_s*10 =

(100 – 5 –70)*1,0*10= 250 g/l

No. of installation according to Annex I	Requirements according to a „simplified verification“
Other printing processes, rotary screen printing (No 1.3)	Input of printing colours, clear-coatings, adhesives, auxiliaries with a maximum solvent content of < 10 %
Installations without environmental authorisation (15 t/year) of No 4.1-4.5 for serial coating of cars, truck cabins, vans and trucks, buses or trains as well as installation of No 5.1 verhicle refinishing and No 8.1 on coating of other coating of metal, plastics (<15 tonnes/year respectivly <25 kg/h))	Coating products with a VOC-value ≤ 250 g/l as well as cleaning agents with < 20 weight% of VOC‘s
Vehicle refinishing (No 5.1) without environmental authorisation (<15 tonnes/year respectively <25 kg/h)	Input substances may not exceed certain VOC limit values (see table)
Wood or plastic lamination without environmental authorisation (No 13.1) as well as adhesive coating No 14.1	Input of adhesives and primers with a maximum VOC content of < 5 weight%

Maximum VOC content limit values for vehicle refinishing

Product	VOC [g/l]	Product	VOC [g/l]
Gun wash	850	Grinding fillers	540 (1)
Pre-cleaner	200	Wet-in-wet fillers	540 (2)
Bodyfillers/stoppers	250	One layer-uni-topcoat	420
Wash primers	780	Base-coat	420
General primers	540 (1)	Clear-coat	420 (3)
Fillers	540 (1)	Special finishes	840 (3) (4)

1) From 01.01.2010; 2) From 01.01.2010: <420; For 1) and 2): if use is possible according to state of the art

3) From 01.01.2010 adaption to the best available techniques; 4) Ratio of special finishes: ≤10 %

Note: Decopaint Directive has no strengthening from 2010

Example of a declaration

..... (Address responsible authority)

.....

.....

Legally binding declaration according to reduction scheme Annex IV C („simplified verification“) No ... in conjunction with § 5 (7) of 31. BImSchV

Dear Sir and Madame,

We are operating an installation without the requirement of an environmental permit for..... according to Annex I, No ...., of 31. BImSchV at our site.....

Relating to § 4 sentence 2 of 31. BImSchV we have decided on application of the reduction scheme according to Annex IV C („simplified verification scheme“), No ..... In case of our installation only substances with the following maximum VOC content referred on Annex VI C No .... of 31. BImSchV will be applied. The VOC values refer on ready to use coating including the dilution recommended by producer:

Installation/Activity according to Annex I		Max. VOC content	Tick where applicable
1.3 Other printing processes, rotary screen printing	printing colours, clear-coatings, adhesives and auxiliaries	< 10 weight%	
4.1 – 4.5 Serial coating of cars, truck cabins, vans and trucks, buses or trains	a) Coating products: b) Cleaning agents:	a) ≤ 250 g/l b) ≤ 20 weight%	
8.1 Coating of other coating of metal, plastics	a) Coating products: b) Cleaning agents:	a) ≤ 250 g/l b) ≤ 20 weight%	
9.1 Coating of wood	a) Coating of plane parts b) Coating of other surfaces c) Water based woodstains	a) ≤250 g/l b) ≤450 g/l c) ≤300 g/l	
13.1 Wood and plastic lamination	Adhesives and primers	< 5 weight%	
14.1 Adhesive coating	Adhesives and primers	< 5 weight%	

According to § 5 (7) of 31. BImSchV we declare binding that we will apply the reduction scheme *[in case of new installations/essential changes: from now on; in case of existing installations: from 01.11.2005*] and permanent. The necessary documentation of the applied coating materials will be carried out and can be shown to the responsible authority upon request.

Please, inform us if you accept our binding declaration.

Best regards

Location, date and signature of legal authorized representative of the company

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