TFTEI

Under the Convention on Long Range Transboundary Air Pollution

State of progress of the work plan implementation, TFTEI activities

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TEFTEI steering group meeting
20 October 2017 - Rome, Italy

Agenda

- Final development of the estimation of costs of reduction techniques for:
  - ✓ The car manufacturing industry
  - ✓ The packaging printing industry
  - ✓ ERICCa LCP and VOC recent updates
- Development of the clearing house

Agenda

- Final development of the estimation of costs of reduction techniques for:
  - ✓ The car manufacturing industry

Characteristics of the coating of passenger cars

Plants

Solvent Consumption > 200t/a

A reference paint shop line with high production capacity and medium sized body.

Installation:

Type of vehicle: passenger car – PC (M1-vehicle)

Body size: electrophoretic coating area: 97 m² per unit (see chapter 5)

Production capacity: 60 jobs per hour, and 200 000 units per year

Pollutant considered: VOC

VOC emission: g/m²

Characteristics of the coating of passenger cars

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The different coating steps are as follows (in brackets: common abbreviations):

1. [PT] Pretreatment (cleaning and corrosion protection)
2. [EC] Electrophoretic coating (E-coat (corrosion protection)
3. [SD] Sealing and damping
4. [PR] Primer (smoothing, spreading, stone chip protection, UV protection)
5. [BC] Base coat (colour, colour effects, appearance)
6. [CC] Clear coat (shine, appearance, scratch and chemical resistance)
8. [RE] Finish and paint reworking
7. [CP] Cavity preservation (corrosion protection)

Characteristics of the coating of passenger cars

Plants

Solvent Consumption > 200t/a

4 families of paint shops studied :

- ✓ SB: entirely solvent-based coating,
- ✓ WB: water-based coats in primer and base coat stage (CC is always clearcoat)
- ✓ SB-MIX: either primer or base coats are solvent based ,
- ✓ Integrated process (IP): primerless paint shop

Characteristics of the coating of passenger cars

Technologies

Three options with combination of primary and secondary options to reduce VOC emissions considered:

1. Primary measures corresponding to the reduction of VOC emissions at the source (reduction of solvent consumption or improved collection of solvent),
2. Secondary measures to treat waste gases containing VOC (end of pipe techniques),
3. Change for a new paint shop (which allows to employ water based paint systems and advanced paint application and waste gas treatment techniques).

Cross media effects detailed as well

Characteristics of the coating of passenger cars

Costs

Costs estimated for many combination including new paint shops with cost efficiency analysis. Exemple of results

Primary measures	Cost effectiveness	
	(€/g/m^2)	(€/t VOC avoided)
Collection of solvents	11 243 [3 997 – 89 941]	580 [206 – 4 636]
Optimisation of cleaning cycles	30 [0 – 1 259]	1,5 [0 – 64,9]
100% automation of primer, base coat, clear coat	749 509 [224 853 – 1 308 234]	38 634 [11 590 – 67 435]
Optimisation of colour change technology (base coat)	179 882 [49 059 – 1 670 335]	9 272 [2 529 – 86 100]
Innovative application technology (e.g bell-bell)	101 184 [62 959 – 149 902]	5 216 [3 245 - 7 727]
100% Automation of interior coating, with rotational bell atomisation and low los colour changers (base coat, clear coat)	542 165 [120 778 – 2 828 793]	27 947 [6 226 – 145 814]
Replacement of pneumatic guns application with robots by electrostatic bells (base coat)	59 830	14 234

Characteristics of the coating of passenger cars

Report

Report circulated in february 2017.

Report largely used as reference and sources of data to complement the chapter on car manufactruring in the draft FREF STS (recently issued by EU JRC IPTS)

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Packaging Printing Sector - Specifics

Plants	Solvent Consumption > 200t/a
Technologies	Printing: *Flexography, Rotogravure* Laminating Coating (Cleaning Agents)
Primary Measures	**Substitution:** Water-based inks, UV curing inks, solvent-based inks with lower solvent content **Better capture rate and management of solvents**
Secondary Measures	**Oxidation:** Recuperative (with or without catalyst) Regenerative **Adsorption and Solvent Recovery**
Report	Report finalized with hardly any industry collaboration, focus of KIT on development of ERICCa_VOC

Packaging Printing Sector - Specifics

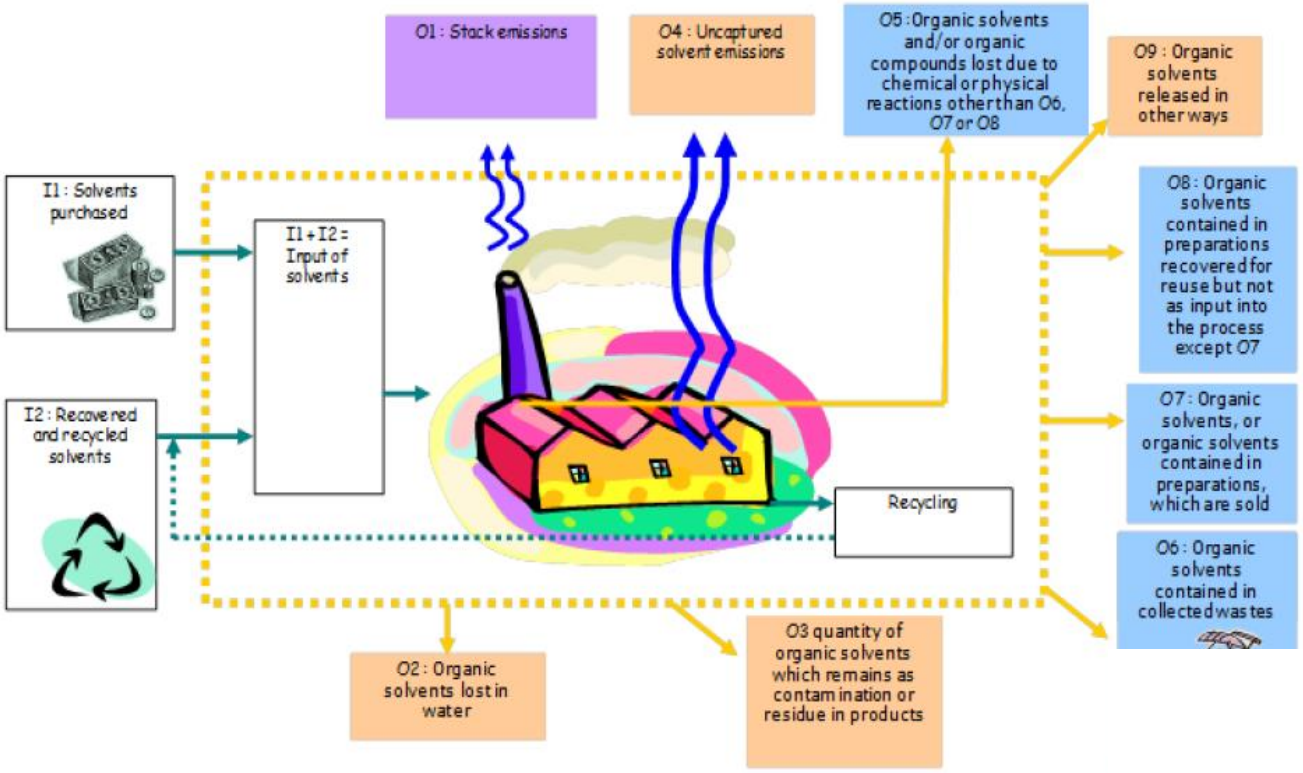
Flue Gas

Typical VOC concentrations: > 1g/m³
=> **Usually no preconcentration necessary**

Solvent Management Plan

Important flows:

- **I1**
- **(I2)**
- **O1**
- **O4**
- **O6**
- **O8**



Packaging Printing Sector - Specifics

Industry Information

- Investment decisions are massively influenced by technical/economical aspects

⇒ Emission reduction is often not the primary motivation

- The technical feasibility of recycling solvents is influenced by the number of solvents in use
- The installed equipment is also influencing the usage of solvents (in case of solvent recovery installation, single-solvent is favored whenever possible)

Cross-Media Effects

- Oxidators may cause other emissions (NO_X, CO_2, etc.)
- The use of water-based or low-solvent inks may negatively influence the operating conditions of secondary measures
- Water-based inks can cause ground water emissions

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ERRICa LCP
Summary, Outlook and Open Tasks

Dissemination

- Presentation and discussion with the EECCA-Group in Berlin (March 2016) and St. Petersburg (October 2016)
- Successful application in dissertation of Jonathan Van der Kamp (to be published soon)
- Used by some industries in France
- Referenced in the BREF on large combustion plants

Recent activities

- Maintenance
- Troubleshooting

Outlook

- Future activities depending on workplan of TFTEI

ERICCa_VOC
Summary, Outlook and Open Tasks

Implementation of ERICCa_VOC

- Implementation completed with comments from TFTEI technical secretariat and industry
- MS-Excel tool without VBA support
  - ⇒ Ensures compatibility
  - ⇒ Facilitates future adaptations

Functions

- Cost calculation for primary and secondary VOC abatement measures (2°: oxidation and adsorption)
- Integrated contemplation or individual calculation of measures (e.g. only oxidation) possible
- Consideration of the solvent management plan is possible

Documentation

- Technical document has been finalized recently and will be publicly available soon

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Current status of progress

- ✓ General information on reduction techniques for SO_2, NO_x, PM, VOC, HM and POP: made available by TFTEI experts
- Stationary sources:
  - SO2, NOx, PM, VOC : implemented
  - HM to be included with PM : in progress,
  - POP to be done later but first data on dioxins prepared
- Mobile sources: work programme of the next year 2018
- Links to other clearing houses: in good progress
- ✓ Exchange Platform:
- Latest developments on reduction techniques by suppliers:

4 documents uploaded

- Experience and feedback by plant operators:

No information received up to now

Focus on data collection of information from suppliers and industrial users

Through E-Mail, face to face meetings, networks

- List of equipment manufacturers consulted by the technical secretariat
  - Focus sectors: NO_X, SO_2 and PM abatement
  - ~175 companies (focus countries: Germany, Austria, Switzerland) 50 in France
- List of plant operators (more than 350 in Germany): Focus sectors: Electricity Generation, Refineries, Metallurgical Plants, Chemical Industry, Cement Manufacture)
- Visits of European industry associations (cement, glass, electricity, non ferrous…)

Focus on data collection of information from suppliers and industrial users

Data expected

- 2 industries should provide information,
- Meeting with VGB (international technical association for generation and storage of power and heat) in Germany scheduled in the next week

Thank you very much for your attention! Questions?

TFTEI Technical Secretariat

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