The review of the BAT Reference Document on Surface Treatment using organic Solvents (STS BREF)

Workshop to promote the understanding and implementation of BAT across the entire UNECE region with focus on countries in the EECCA region

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Outline of this presentation

1 - The sector and the current STS BREF document

2 - The review process
THE ACTIVITY

Current STS BREF's scope was based on IPPC's Annex I, 6.7 activity - identical to current IED Annex I, 6.7:

Surface treatment of substances, objects or products using organic solvents, in particular for dressing, printing, coating, degreasing, waterproofing, sizing, painting, cleaning or impregnating, with an organic solvent consumption capacity of more than 150 kg per hour or more than 200 tonnes per year.

All the related industries are also regulated by IED Chapter V, Annex VII provisions (the former Solvent Emissions Directive 1999/13/EC).
The STS sector in figures (installations)

- STS is not a homogeneous sector and covers several industries with significant differences in substrate materials and dimensions; applied techniques (including pretreatment stage); installation sizes (ranging from SMEs to multinational)
- Significant number of installations on surface treatment using organic solvents with a solvent consumption capacity below the IED threshold
- The only IED sector where there is the possibility an installation to drop out by application of BAT

Number of IED installations per MS above the IED Annex I, activity 6.7 threshold in the European Union (2011 data)

| MS | AT | BE | BG | CY | CZ | DE | DK | EE | EL | ES | FI | FR | HR | HU | IE | IT | LT | LU | LV | MT | NL | PL | PT | RO | SE | SI | SK | UK |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 6.7| 34 | 38 | 21 | 294| 10 | 6  | 15 | 86 | 23 | 178| 7  | 10 | 221| 4  | 1  | 27 | 60 | 22 | 15 | 27 | 4  | 16 | 29 | 1148|

**Source:** European IPPC Bureau
The STS sector in figures (emissions)

In total, IED Annex I, 6.7 installations emit 570 kt of NMVOCs that correspond to 60% of total IED installations emissions (947 kt) and to 13% of total anthropogenic ones (4300 kt). It is interesting that non-IED Annex I, 6.7 installations (these below the IED Annex I threshold) have total NMVOC emissions of 820 kt (AMEC report, 2010 data).
Scope of the current STS BREF document

In particular, current BREF discussed:

- three printing processes (heatset web offset, flexible packaging and publication gravure)
- coating and/or painting of winding wires, cars and commercial vehicles, buses, trains, agricultural equipment, ships and yachts, aircraft, steel and aluminium coil, metal packaging, furniture and wood, as well as other metal and plastic surfaces
- adhesive application in the manufacture of abrasives and adhesive tapes
- impregnation of wood with solvent-based preservatives (including creosote)
- cleaning and degreasing associated with these activities. No separate degreasing industry was identified.

In total: 20 industrial sectors are covered in 18 sector-specific chapters.
Scope of the current STS BREF document

Not considered in the current BREF:

- other dressing, waterproofing, sizing or impregnation processes that may be in the scope of the BREF(s) on Textiles and Tanneries
- the production of laminate boards, chipboard, etc. as these use water-based resins
- industries (or those parts of) or activities using solvents widely known to operate below the thresholds
- the manufacture of paints, inks, adhesives, pharmaceutical products etc.,
Key environmental issues identified in the current STS BREF document

- Emissions of solvents to air; water and groundwater; and soil
- Dust emissions to air
- Energy consumption
- Waste minimisation and management (including reduction of raw material consumption)
- Site condition on cessation of activities

Techniques identified as Best Available Techniques (BAT)

- More than 400 techniques were identified as techniques to consider in the determination of BAT (Best Available Techniques), general (applicable to more than one sectors) and sector specific
Main elements of the current STS BREF document

- **General BAT related to:**
  - Environmental **management** techniques, installation **design, construction and operation**
  - **Monitoring** of solvent emissions including solvent mass balances (solvent management plans)
  - Reducing **water consumption** and/or conserving **raw materials**
  - Minimising **energy usage** and **raw material and waste** management
  - **Systems** for surface treatment, application and drying/curing
  - **Cleaning** processes
  - **Substitution** (using less hazardous substances)
  - **Emissions to air** and waste gas treatment (VOC and dust)
  - **Waste water**
  - **Odour** nuisance and **noise**
  - **Groundwater** protection and site decommissioning

- **In addition numerous sector-specific techniques identified as BAT**
BAT-associated emission levels in the current STS BREF document

- BAT associated emission levels (BAT-AELs) expressed (for the majority of the sectors) as total emissions in relation to consumption figures or production throughput, e.g. per m² or Kg of coated surface, % of solvent input, % of solids input, % of ink consumption.

- For a number of activities and when comparison is possible, current’s BREF BAT-AELs are well below the IED Annex VII ELVs.
Outline of this presentation

1 - The sector and the current STS BREF document

2 - The review process
The Technical Working Group (TWG) for the exchange of information

<table>
<thead>
<tr>
<th>Country</th>
<th>Members</th>
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<tbody>
<tr>
<td>Austria</td>
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<tr>
<td>European Commission</td>
<td>20</td>
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<td>Belgium</td>
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<td>Environmental NGO</td>
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<td>Czech Republic</td>
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<td>Industry</td>
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<td>Estonia</td>
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<td>Finland</td>
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<td>United Kingdom</td>
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The STS TWG is currently consisting of 197 members from 21 MS, 1 Environmental NGO, 20 industry associations and the European Commission.
# The review process - timetable

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Date/period</th>
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<tr>
<td>Reactivation of the TWG</td>
<td>10 December 2014</td>
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<td>Nominations of TWG members</td>
<td>30 January 2015</td>
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<td>Call for expression of initial positions</td>
<td>15 May 2015</td>
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<td>Kick-off Meeting (KoM)</td>
<td>16–19 November 2015</td>
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<td>Data and additional information on KEI, new processes and techniques</td>
<td>December 2015 (on going)</td>
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<td>Questionnaire development</td>
<td>February 2016 (on going)</td>
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<td><strong>The next steps</strong></td>
<td><strong>Foreseen period (tentative)</strong></td>
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<td>Collection of plant-specific information and data (through the questionnaires)</td>
<td>Q3 2016</td>
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<td>First draft of revised BREF document</td>
<td>End of Q4 2016 - Q1 of 2017</td>
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<td>Final TWG meeting</td>
<td>Around end 2017</td>
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The review process – Scope – A new IED activity included

- The STS BREF review covers in one document two activities of IED Annex I, the already covered 6.7 'STS' activity and the IED Annex I 6.10 (Wood preservation with chemicals – WPC) one:

"Preservation of wood and wood products with chemicals with a production capacity exceeding 75m³ per day other than exclusively treating against sapstain"

This activity was partially covered in the current BREF (preservation using solvent-based preservatives and creosote) and in the revision process, preservation using water-based preservatives is also included.
The review process – Scope and structure

- No detailed data collection for some sectors with no or few installations above the IED capacity threshold (manufacturing of abrasives, mirrors).

- New activities to be included into the data and information collection:
  - PU (polyurethane) and PVC textile or fabric coating and impregnation using DMF (N,N-dimethylformamide – a hazardous substance)
  - Other coating processes for the production of: self-adhesive labels, lamination film, paper foil, synthetic film (to be included into current chapters’ information)

- Merging of technical information on applied production processes and implemented techniques, e.g. coating of ACE (agricultural and construction equipment) with train coating and other metal surfaces coating
The review process – Key environmental issues

Data and information gathering (through the plant-specific questionnaires) will focus on:

- Emissions to air:
  - VOCs as total emissions, in waste gases and as fugitive emissions
  - dust (where relevant)
  - Substances of Very High Concern (SVHC),
  - NOx and CO from thermal waste gas treatment
- Emissions to water: VOCs, SVHC and metals
- Water and energy consumption
- Raw material management, waste generation prevention and waste treatment
- Emissions to soil and groundwater of solvents and other chemicals
The review process – Data and information to be collected

- All the contextual information on the applied techniques in order to combine techniques with achieved emission levels
- Interface with other BREFs:
  - Water-based techniques: Surface treatment of metals and plastics BREF document (the STM BREF). In STS keep only directly associated water-based techniques
  - Energy efficiency techniques: Energy Efficiency Reference Document (the ENE BREF)
  - Other related BREF or reference (REF) documents: Emissions from storage (EFS), Common waste water and waste gas treatment/management systems in the chemical sector (CWW), Reference document on monitoring of emissions from IED installations (ROM)
The review process – information on techniques

- To update the currently available information on techniques (delete obsolete techniques, complete the current information on valid techniques based on the 10-heading template for the information submission on a candidate BAT).
  - Emphasis is given to the performance of installations and techniques in terms of emissions and consumption, associated monitoring and economic and technical viability
  - Ensure consistency on technique descriptions with recently adopted BAT conclusions in other BREFs (e.g. CWW)
The review process – Data collection through questionnaires

Data on emissions and consumptions combined with contextual information on the applied techniques from installations that:

- Are representative of the sector as a good environmental performer, including best performers;
- Are representative of the sector in terms or materials, processes and techniques used, products, size (in terms of capacity), age (of process line(s): recent, less recent and upgraded) and geographical location within the EU;
- Are willing to participate and have data availability
Techniques for reduction of VOC emissions to air

- **Primary measures** (techniques related to the used materials or the process):
  - **Substitution** of used raw materials in production and associated processes: less hazardous, low-solvent or non-solvent inks and coatings, degreasing/cleaning materials
  - More **efficient** processes: in pretreatment, in paint/coating application; in ink/coating transfer; in cleaning
  - **Installation design, maintenance and operational** issues including storage and handling of organic solvents, solvents in waste water and wastes
  - **Monitoring** – the solvent management plan is a key technique to understand consumption and emissions – need to be reliable with the less possible assumptions
Solvent management plan (SMP)

A key technique to calculate total emissions and fugitive emissions in order to assess compliance with the relevant limit values. In addition the key technique for calculation of target emissions in case that a reduction scheme is applied.

Main points:
- Annual calculation
- Identification and limitation of uncertainties and accuracy problems
- Sector/activity and site particularities to be taken into account (site-specific SMP)
Solvent management plan (IED Annex VII, Part 7)

F = O2 + O3 + O4 + O9 or F = I1 – O1 – O5 – O6 – O7 – O8
E = F + O1 or E = I1 – O5 – O6 – O7 – O8

O4: Uncaptured

O1: Waste gases

O5: Destroyed (oxidation or biological)
O5: Captured

I1: Purchased

I2: Reused

Installation

O2: Lost in water
O3: Residue in product
O9: Other emissions

O6: In collected waste
O7: In product to be sold
O8: Reuse not in the process
Techniques for reduction of VOC emissions to air

- **Secondary measures**
  - Waste gas **capturing, extraction and pretreatment**: Techniques for containment, capturing, extraction, collection, pretreatment and filtration
  - Waste gas treatment:
    - **non-destructive** techniques which allow possible recovery, recycling and/or reuse of solvents: *adsorption* on activated carbon or zeolite substrates; *absorption* in adapted scrubbing liquors (water, oil); *condensation*.
    - **destructive/oxidation** techniques: valorisation of the energy content of present VOCs, in combination with extraction and VOC concentration optimisation techniques in order to reduce the need for additional fuel, the energy consumption and related emissions of other pollutants
Applied techniques choice

Principle parameters that dictate the selection of the control technique:

- **Administrative**: Compulsory emissions and other environmental standards to be reached as provided by nationally and/or locally applied legislative provisions.

- **Site specific: and process-related**: Type, concentration and composition of VOC in raw gas, applied production processes, substrate type

- **Economic**: Investment cycle; installation, operation and maintenance cost
STS BREF REVIEW – CHALLENGES

- Time
- Estimates for Solvent Management plans
- Number and range of industries (wood, metal, winding wire, ships); size and substrate → Therefore large number & different scale of techniques
- KEIs identification
- Complexity of legislation and its approaches
- Addition of WPC:
  - lack of experience of process,
  - little MS data on numbers, etc
STS BREG REVIEW – STRENGTHS

- Some well-organised industry groups especially for major emitters assisting with data provision, including paint, ink manufacturers
- MS TWGs national preparations (e.g. reports on identification of key issues, processes and techniques applied, etc.)
- Core team gets internal support of whole EIPPC team at key points, commenting, etc. (more collaborative working method)
Useful information and links

- **European IPPC Bureau (EIPPCB)**
  
  http://eippcb.jrc.ec.europa.eu/

- **Industrial Emissions Directive (IED)**
  

- **The current STS BREF document**
  
Thank you for your attention

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