SOLVENT USE

e-ANNEX Submission under the UNECE Convention on Long-range Transboundary Air

Czech Hydrometeorological Institute

Determination of emissions from Solvent Use (NFR 2D) in the Czech Republic

Ing. Hana Geiplová
SVÚOM, L.t.d.
U Měšťanského pivovaru 934/4
Praha 7 - Holešovice

Praha, December 2019

Category 2D3a – Domestic solvent use including fungicides

Methodological issues

The Czech Republic used a national approach to quantify emissions from category 2D3a - Domestic solvent use including fungicides in previous periods. This category is significant in VOC emissions. After 2004 (access to the EU and implementation of Directive No. 99/13 / EC on limiting emissions of volatile organic compounds), the measures aimed at reducing the content of solvents in used retail products were introduced. At the same time, the average emission factor for the determination of emissions was reduced. Given the fact, that The Czech Republic is not able to transparently prove the reasons for the use of the reduced emission factor, calculation is based on EMEP/EEA EIG where emission factor is 1200 g/capita for other countries for 2018 reporting. Activity data (Mid-year population) is from Czech Statistical Office.

Despite the efforts made, it is not possible using Tier 2 methodology in this time, because The Czech Republic have no relevant activity data about consumption of the products and VOC content in branch where is connected with category 2D3a - Domestic Solvent use including fungicides.

Category 2D3b – Road paving with asphalt

Methodological issues

Basically there are two sources of volatile organic compounds (VOCs) in the sector 2.D.3.b Road paving with asphalt: cutback asphalt and emulsified asphalt. The combustion emissions of gaseous and liquid fuels in hot mix plants are collected separately under sector NFR 1.A2.f and VOCs content in hot mix plants asphalt is considered to be zero.

The content of VOCs by mass is considerably higher in cutback asphalt and was assessed 22.5 % by mass. On the other hand the total amount of cutback asphalt used in the Czech Republic is significantly lower than 1 Gg. There was a rapid decrease in the use of cutback asphalt since 1990s (VOCc).

Emulsified asphalt prevails as cold asphalt technology in the Czech Republic and due to a very low content of mainly paraffin emulsifier (0.5 % by mass), the total VOC emission for emulsified asphalt (VOCe) is almost comparable with cutback asphalt. The total emission of VOCs is the sum of both but activity data for emulsified asphalt collected by Road Construction Association are available since 2005.

Category 2D3c – Asphalt roofing

Methodological issues

For reporting emissions from category 2D3c - Asphalt roofing, emissions reported in the manufacture of products used for building insulation are used. Annual production is less than 50 tonnes. The asphalts without light parts of petroleum, resp. volatile parts, are purchased directly for production and emission measured by one-off measurements by individually monitored sources are very low. These sources include all three registered producers and other, smaller production, are not expected in this sector.

Category 2D3d – Coating applications

This source category comprises NMVOC emissions from the use of solvent-based products of three major sub-categories: Decorative coating applications, industrial coating applications and other non-industrial paint application.

Methodological issues

This source category comprises NMVOC emissions from the use of solvents in the following manufacture processes:

060101   Manufacture of automobiles
060102   Car repairing
060104   Domestic use
060105   Coil coating
060108   Other industrial paint application
060109   Other non-industrial paint application

Tier 2 and Tier 3 are used for emission inventory.

The 2D3d category contains several other sub-categories corresponding to the original SNAP classification. In the Czech Republic, emissions are specific survey of these previously used categories. The most important group is industrial applications. Information determined by one-off measurements and balance calculations made by individually monitored sources is used for the determination of emissions. These sources include all car manufacturers, rail vehicles, car repairing shops and industrial use of paints in production processes such as metal products, agricultural machinery, military equipment, manufacture of car parts, toys and other activities, wood, plastics, etc. Emissions from the use of paints mainly for maintenance, construction or household use are estimated using available statistical data and parameters of VOC content in the agents used.

Domestic paint application category, takes into account only conventional solvent-based paints. Balance was made on the base of number of family houses and holiday cottages. Emission factor 230g/kg paint was used for calculation of total emission.

The non-industrial pain applications are mainly repairs of constructions, marking of roads, corrosion protection of bridges, building and machine constructions, energy pipelines, piping systems of new production units, etc. all emissions of this branch are completely fugitive.

The total category of coating application was checked by a balance calculation based on the total consumption of paints in the whole range, ie. production + import – export and VOC concentrations in these products (substances and preparations).

Category 2D3e – Degreasing

Methodological issues

This source category comprises NMVOC emissions from the use of solvents in the following manufacture processes:

060201   Metal degreasing
060203   Electronic component manufacturing
060204   Other industrial cleaning

Tier 2 is used for emission inventory.

The 2D3e category contains several other sub-categories corresponding to the original SNAP classification. In the Czech Republic, emissions are specific survey of these previously used categories. The most important group of resources belongs to the field of industrial degreasing. The amount of solvents is allocated to the source category, and then the relevant NMVOC emissions are calculated using specific emission factors. Data from REZZO is used.
These sources include all manufactures rail vehicles, important manufactures of the other branches of engineering, mainly automotive, production various component, tools, equipment, fasteners, etc. It also includes cleaning activities related to the industrial use of paints in production processes (metal products and plastics). Emissions from degreasing arise mainly from maintenance, some construction branches, from field application etc. They are established using several sources, mainly REZZO, statistic data about consumption of agents with VOC content. This category has a decreasing tendency due to the pressure of Solvent Emission Directive and the introduction of new technologies.

Category 2D3f – Dry cleaning

Methodological issues
Emissions reported in the REZZO national emission database are used to quantify emissions from category 2D3f - Dry cleaning. In this branches are used modern technological units and their emissions are therefore very low. Emissions from non-commercial plants are not expected in this sector.

Category 2D3g – Chemical products

Methodological issues
This source category comprises NMVOC emissions from the use of solvents in the following manufacture processes:

060301   Polyester processing
060302   Polyvinylchloride processing
060303   Polyurethane processing
060304   Polystyrene foam processing
060305   Rubber processing
060306   Pharmaceutical products manufacturing
060307   Paints manufacture of
060308   Manufacture of inks
060309   Glues manufacturing
060310   Asphalt blowing

060311   Adhesive manufacturing, magnetic tapes manufacturing, photographs manufacturing

In the Czech Republic, emissions are specific survey of these previously used categories. Individual categories are balanced based on available statistics. These are mainly the amount of production reported by the CSU, emissions from REZZO and reporting to the E-PRTR Regulation, IRZ. Total emissions of NFR 2D3g are the sum of individual categories. Tier 2 emission factors were used for their determination. Some categories are determinate by using special reporting (e.g. IPPC document, REZZO, company annual reports). For some categories, data from the permitting agenda for the Integrated Pollution Prevention Control and annual reports on compliance integrated permit conditions are also used. In these categories are used Tier 3.

The most important group of resources belongs to the field of industrial applications. Information determined by one-time measurements and balance calculations made by individually monitored sources is used for the determination of emissions. These sources include a large number of manufacturers of paints, pharmaceuticals, adhesives, asphalt blowing, textile finishing, leather processing and some processes using chemical products. Emissions from the use of chemical products mainly for maintenance and construction are estimated using available statistical data and assumptions of volatile component leakage when using chemical products. Detailed information on some technologies is provided below.

PAHs emissions from asphalt blowing are not estimated. According our investigation the technology of asphalt blowing is equipped with flue gas combustion and produces therefore only trace exhaust concetrations of NMVOC.

Tier 2 and TIER 3 are used for emission inventory.

060301   Polyester processing

In this sector are reported emissions from composites production usage liquid unsaturated polyester resins with styrene content and with projected consumption of volatile organic compounds from 0.6 tonnes per year (Act No. 201/2012 Coll., Code 9.19).

Activity data
Activity data are from REZZO.

Methodology
TIER 3 was used. VOC Emission was increased of 20% connected with uncertainty of reported emissions (number of facilities with projected capacity smaller than limited value for reported under act.)

060302   Polyvinylchloride processing

Activity data
Activity data are from Annual report of producer and verification was made by IRZ database.

Methodology
TIER 3 was used.
Emissions of chlorinated hydrocarbons from VCM, resp. PVC production are influenced by the start-up and run-off frequency and the failure rate at which emissions are vented to the atmosphere via a scrubber and adsorption unit or the adsorption unit shutdown per se.

060303   Polyurethane processing

Activity data
Activity data are from BREF document creation and verification was made by REZZO.

Methodology
TIER 3 was used.

060304   Polystyrene foam processing

Activity data
Activity data, quantity produced of polystyrene foam, are from ČSU.

Methodology
TIER 2 was used. Emission factor form EMEP/EEA EIG 60g/kg polystyrene was used for calculation.

060305   Rubber procesing

Activity data
Activity data, the amount of rubber to be processed, are from ČSU.

Methodology
TIER 2 was used. Emission factor from EMEP/EEA EIG 8g/kg rubber produced was used for calculation.
TIER 3 was used. Only the emission in category 060307 is increase about 30 % for small sources, but these will be only mixers shop, a large manufacturer is not to be expected.

Activity data
Activity data are from REZZO.

060314   Tyre production

Activity data
Activity data, the amount of tyres produced, are from ČSU.

Methodology

TIER 2 was used. Emission factor form EMEP/EEA EIG 10g/kg tyres produced was used for calculation.

Category 2D3h - Printing

Methodological issues
NMVOC emissions are calculated in keeping with a product-consumption-oriented approach. The quantity of the printing inks corresponds to the domestic consumption which is all import. Domestic production is not reported in CSU data. The product quantities used are determined at the product with the help foreign-trade statistics. Where possible, the so-determined domestic-consumption quantities are then further verified via cross-checking with industry statistics, mainly REZZO.
TIER 2 is used for emission calculation.

Specific information
Emissions of this source group decreased due to environment policy, Degree about air protection (1991, 2002, 2012), smaller application of isopropanol and more environmentally friendly technologies and changes in single technologies (e.g. printing of books got less important, rising digital printing technology), which influences total emissions of 2D3h.

Category 2D3i - Other Solvent Use

The following product groups and processes are taken into consideration:

060401	Glass wool enduction
060402	Mineral wool enduction
060404	Fat, edible and non-edible oil extraction
060405	Application of glues and adhesives
060406	Preservation of wood
060407	Underseal treatment and conservation of vehicles
060409	Vehicles dewaxing
060412	Other

Methodological issues

The 2D3e category contains several other sub-categories corresponding to the original SNAP classification. In the Czech Republic, emissions are specific survey of these previously used categories. Information from by one-time measurements and balance calculations made by individually monitored sources is used for the determination of emissions. These sources include all producers of glass and mineral wool, oil extraction, industrial wood protection, processes in the production and long-distance transportation of cars. Emissions from other activities include applications of adhesives and adhesives for maintenance, construction, etc., and are estimated using available statistics and volatile component content parameters in the formulations used.

Aktivity data

The following table provides additional information

060401	Glass wool enduction	Czech Statistical Office, EMEP/EEA EIG + TIER2
060402	Mineral wool enduction	Czech Statistical Office, EMEP/EEA EIG + TIER2
060404	Fat, edible and non-edible oil extraction	REZZO, reported by operators, verification by expert calculation, TIER 3
060405	Application of glues and adhesives	REZZO; reported by operators, TIER 3
060406	Preservation of wood	Czech Statistical Office; reported by operators, TIER 3
060407	Under seal treatment and conservation of vehicles	Not included (emissions are negligible)
060409	Vehicles dewaxing	Not included (emissions are negligible)

060412 Other

Methodological issues

This category summarised unnamed use of solvent, eg. emission from production of mirror, glass and bijouterie, de-icing agent, concreate additive. The quantities of usage product are determinate using production, import and export statistic. Where it is possible, the verification is performed due cross-checking with industry report.
TIER 2 is used.