WGC BREF D1 Main Aspects

GZS Conference, January 29, 2020

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Generic BREF Timeframe

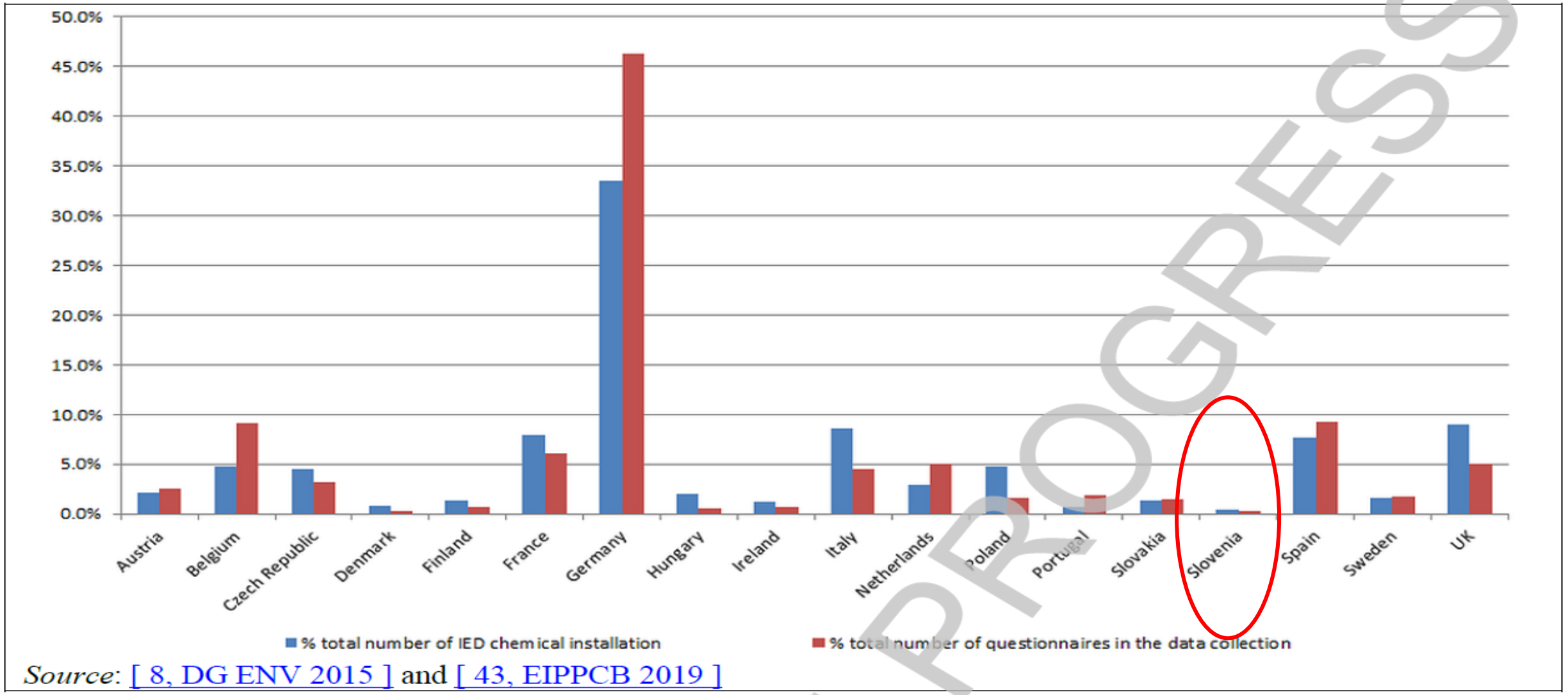
The following 10 steps are based on the „BREF Guidance“ (Commission Implementing Decision 2012/119/EU):

Step	BREF review step	Expected time	Accumulated time
1	TWG (re)activation and call for initial positions	2 months	2 months
2	Kick-off meeting	3 months	5 months
3	New information	6 months	11 months
4	Elaboration of first draft	4-6 months	15-17 months
5	TWG comments on first draft	2-3 months	17-20 months
6	Elaboration of second draft (optional)	3-7 months	20-27 months
7	TWG comments on second draft (optional)	2-3 months	22-30 months
8	Final meeting	3-5 months	25-35 months
9	Revised draft after the Final Meeting	4 months	29-39 months
10	Presentation at Article 13 Forum meeting	undefined	undefined

WGC BREF 2015-2019

- Spring 2015: Cefic forms WGC Shadow Group
- Oct 2015: Art 13 Forum decides upon the WGC BREF
- July 2016: Cefic meets JRC and BREF authors in Sevilla
- 2016 Nov/Dec: Call for Initial Positions
- 9/2017: Kick Off Meeting
- 12/2017: Art 13 Forum (agreement on LVIC BREF(s))
- 3/2018: Interim Kick Off Meeting (final scope conclusion)
- 7/2018-12/2018: Data collection
- 6/2019: Data workshop, collection extended to 09/2019
- Nov 28, 2019: Draft 1 issued

WGC BREF Data collection



Source: [8, DG ENV 2015] and [43, EIPPCB 2019]

Figure 2.2: Share of number of chemical IED installations in Europe versus share of questionnaires

WGC BREF Draft 1

- Draft 1 was issued at the end of November 2019
- 330 Pages, 36 BAT (best available techniques) conclusions
- Concept of ‘relevant’ substances/emissions (BAT 2, BAT 8)
- Concept of mass-flow thresholds based on emission points
- Monitoring, generic and specific BATs/AELs (associated emissions levels) for all KEIs (key environmental issues)
- BATs for diffuse/fugitive emissions
- Qlik-sense tool for data evaluation/Excel data compilation
  - (of limited interested for Slovenian units)

WGC BREF Channeled Emissions

BATs – Example Dust

BAT 13. In order to increase resource efficiency and to reduce the mass flow of dust and particulate-bound metals sent to the final waste gas treatment, BAT is to recover materials from process off-gases by using one or a combination of the techniques given below and to reuse them.

Technique		Description	Applicabiliy
a.	Absolute filter	See Section 4.4.1.	Applicability may be limited in the case of sticky dust or if the waste gas after the absolute filter needs to be treated at temperatures above 150 °C.
b.	Cyclone	See Section 4.4.1.	Generally applicable.
c.	Fabric filter	See Section 4.4.1.	Applicability may be limited in the case of sticky dust or if the waste gas after the fabric filter needs to be treated at temperatures above 250 °C.

Applicability

Applicability may be restricted where the costs are excessive due to the low content in the process off-gas(es).

BATs – Example Dust

BAT 14. In order to reduce channelled emissions to air of dust and particulate-bound metals, BAT is to use one of the techniques given below.

Technique		Description	Applicabiliy
a.	Absolute filter	See Section 4.4.1.	Applicability may be limited in the case of sticky dust.
b.	Absorption	See Section 4.4.1.	Generally applicable.
c.	Fabric filter	See Section 4.4.1.	Applicability may be limited in the case of sticky dust.
d.	High-efficiency air filter	See Section 4.4.1.	Generally applicable.

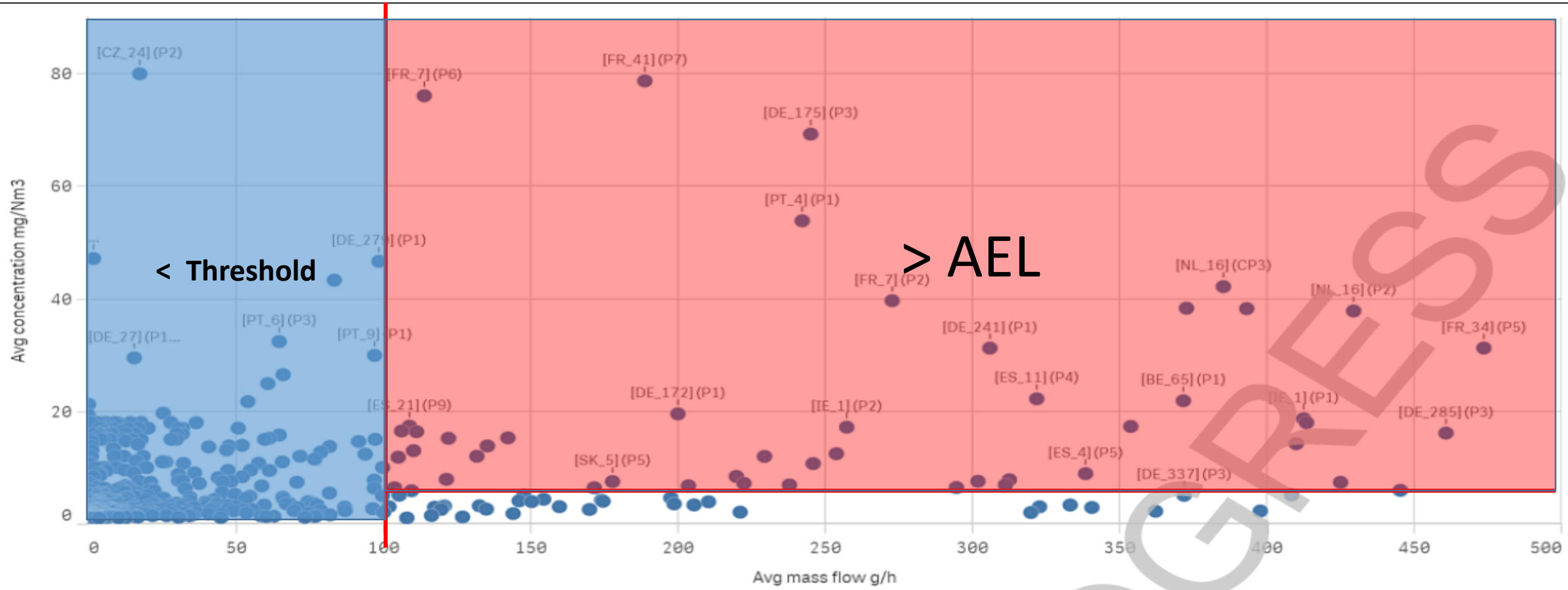
BATs – Example Dust

Table 4.3: BAT-associated emission levels (BAT-AELs) for channelled emissions to air of dust, lead and nickel

Substance/Parameter	BAT-AEL (mg/Nm^3) (Daily average or average over the sampling period)	Mass flow threshold (g/h)
Dust	< 1-5 ([1])	100
Dust containing substances classified as CMR 1A or 1B	< 1-2.5	2.5
Dust containing substances classified as CMR 2	< 1-2.5	15
Lead and its compounds, expressed as Pb	< 0.01-0.5	0.15
Nickel and its compounds, expressed as Ni	< 0.02-0.5	0.15
([1]) The upper end of the range is 20 mg/Nm^3 when an absolute or fabric filter is not applicable.		

The associated monitoring is given in BAT 8.

WGC BREF BAT-AELs
Example: Dust AEL <1-5 mg/Nm^3, Threshold > 100 g/h



NB: 177 operators reported dust emissions from 1 371 emission points in the data collection, applying the common waste gas treatment techniques listed above. For better visualisation, only emission points with concentrations in the range of 0-100 mg dust/Nm^3 and mass flows in the range of 0-500 g dust/h are represented in the scatter plot.
Source: [43, EIPPCB 2019]

Figure 2.67: Dust emissions after waste gas treatment

WGC BREF Draft 1
Concept of ‘relevance’

BAT 2: Inventory of emissions
Level of detail etc. depends on e.g. the environmental impact

BAT 8: Monitoring. Footnote (1) → only applies for ‘relevant’ parameters/substances acc. To BAT 2

BAT 11/12/14/16/18: BAT-AELs → the associated monitoring is given in BAT8

The concept of inventory allows for flexibility considering national and (sector-) specific needs

BREF IT supports this approach

WGC BREF Draft 1 - Monitoring

Substance/Parameter (1)	Emission points	Standard(s)	Minimum monitoring frequency	Monitoring associated with
Ammonia (NH_3)	All emission points	No EN standard available	Once every year (2) (3)	BAT 17, BAT 18
Benzene	All emission points	No EN standard available	Once every 6 months (2) (4)	BAT 11
1,3-Butadiene	All emission points	No EN standard available	Once every 6 months (2) (4)	BAT 11
Carbon monoxide (CO)	All emission points with a mass flow of ≥ 2 kg/h	Generic EN standards (5)	Continuous	BAT 16, BAT 18, BAT 36
	All emission points with a mass flow of < 2 kg/h	EN 15058	Once every year (2) (3)	
Chloromethane	All emission points	No EN standard available	Once every year (2) (3)	BAT 11
Dichloromethane	All emission points	No EN standard available	Once every year (2) (3)	BAT 11
Dust	All emission points	EN 13284-1	Once every year (2) (3)	BAT 14
Elementary chlorine (Cl_2)	All emission points	No EN standard available	Once every year (2) (3)	BAT 18
Ethylene dichloride (EDC)	All emission points	No EN standard available	Once every 6 months (2) (4)	BAT 11
Ethylene oxide	All emission points	No EN standard available	Once every 6 months (2) (4)	BAT 11
Formaldehyde	All emission points	No EN standard available	Once every 6 months (2) (4)	BAT 11
Gaseous chlorides	All emission points	EN 1911	Once every year (2) (3)	BAT 18
Gaseous fluorides	All emission points	No EN standard available	Once every year (2) (3)	BAT 18
Hydrogen cyanide (HCN)	All emission points	No EN standard available	Once every year (2) (3)	BAT 18
Lead and its compounds	All emission points	EN 14385	Once every year (2) (3)	BAT 14
Nickel and its compounds	All emission points	EN 14385	Once every year (2) (3)	BAT 14
Nitrous oxide (N_2O)	All emission points	EN ISO 21258	Once every year (2) (3)	—
Nitrogen oxides (NO_X)	All emission points with a mass flow of ≥ 5 kg/h	Generic EN standards (5)	Continuous	BAT 16, BAT 18, BAT 36
	All emission points with a mass flow of < 5 kg/h	EN 14792	Once every year (2) (3)	
PCDD/F	All emission points from catalytic and thermal oxidation of waste gases	EN 1948-1, EN 1948-2, EN 1948-3	Once every 6 months (2) (4)	BAT 12
$PM_{2.5}$ and PM_{10}	All emission points	EN ISO 23210	Once every year (2) (3)	BAT 14
Propylene oxide	All emission points	No EN standard available	Once every 6 months (2) (4)	BAT 11
Sulphur dioxide (SO_2)	All emission points	EN 14791	Once every year (2) (3)	BAT 16, BAT 18, BAT 36
Tetrachloromethane	All emission points	No EN standard available	Once every year (2) (3)	BAT 11
Toluene	All emission points	No EN standard available	Once every year (2) (3)	BAT 11
Trichloromethane	All emission points	No EN standard available	Once every year (2) (3)	BAT 11
Total volatile organic carbon (TVOC)	All emission points with a mass flow of ≥ 2 kg/h	Generic EN standards (5)	Continuous	BAT 11
	All emission points with a mass flow of < 2 kg/h	EN 12619	Once every year (2) (3)	BAT 11

BREF IT supports this approach

WGC BREF Draft 1 – Monitoring/relevance

(1) The monitoring only applies when the substance/parameter concerned is identified as relevant in the waste gas stream based on the inventory given in BAT 2.
(2) To the extent possible, the measurements are carried out at the highest expected emission state under normal operating conditions.
(3) The minimum monitoring frequency may be reduced to once every three years if the emission levels are proven to be sufficiently stable.
(4) The minimum monitoring frequency may be reduced to once every year if the emission levels are proven to be sufficiently stable.
(5) Generic EN standards for continuous measurements are EN 14181, EN 15267-1, EN 15267-2 and EN 15267-3.

Monitoring of all KEIs needed unless identified as 'not relevant'
Measurements at highest expected emission state

→ CHECK YOUR EMISSIONS against the AELs of ALL substances!!
→ Report reasons for exceedances (so we can try to argue for other AELs)

WGC BREF Draft 1 – Other Substances

DUST is just ONE EXAMPLE of the BATs/AELs. CHECK Draft 1 for ALL DETAILS!

Substance/Parameter	BAT-AEL (mg/Nm^3) (Daily average or average over the sampling period)	Mass flow threshold (g/h)
Total volatile organic carbon (TVOC)	< 1-20	200
Total volatile organic carbon (TVOC) containing substances classified as CMR 1A or 1B	< 1-5	2.5
Total volatile organic carbon (TVOC) containing substances classified as CMR 2	< 1-10	100
Benzene	< 0.5-1	2.5
1,3-Butadiene		
Ethylene dichloride		
Ethylene oxide		
Propylene oxide		
Formaldehyde	1-5	
Chloromethane	< 0.5-1	100
Dichloromethane		
Tetrachloromethane		
Toluene		
Trichloromethane		

Substance/Parameter	BAT-AEL (ng I-TEQ/Nm^3) (Average over the sampling period)	Mass flow threshold (µg I-TEQ/h)
PCDD/F	< 0.01-0.05	0.25

Substance/Parameter	BAT-AEL (mg/Nm^3) (Average over the sampling period)
Ammonia (NH_3) from SCR/SNCR	< 0.5-8 ([1])

([1]) The upper end of the range may be up to 30 mg/Nm^3 in the case of:
- thermal or catalytic oxidation of waste gases containing high levels of NO_X precursors; or
- if the waste gases contain high levels of NO_X prior to treatment with SCR or SNCR.

Substance/Parameter	BAT-AEL (mg/Nm^3) (Daily average or average over the sampling period)	Mass flow threshold (g/h)
Nitrogen oxides (NO_X) from catalytic oxidation	10-50	1 000
Nitrogen oxides (NO_X) from thermal oxidation	50-150 ([1])	1 000

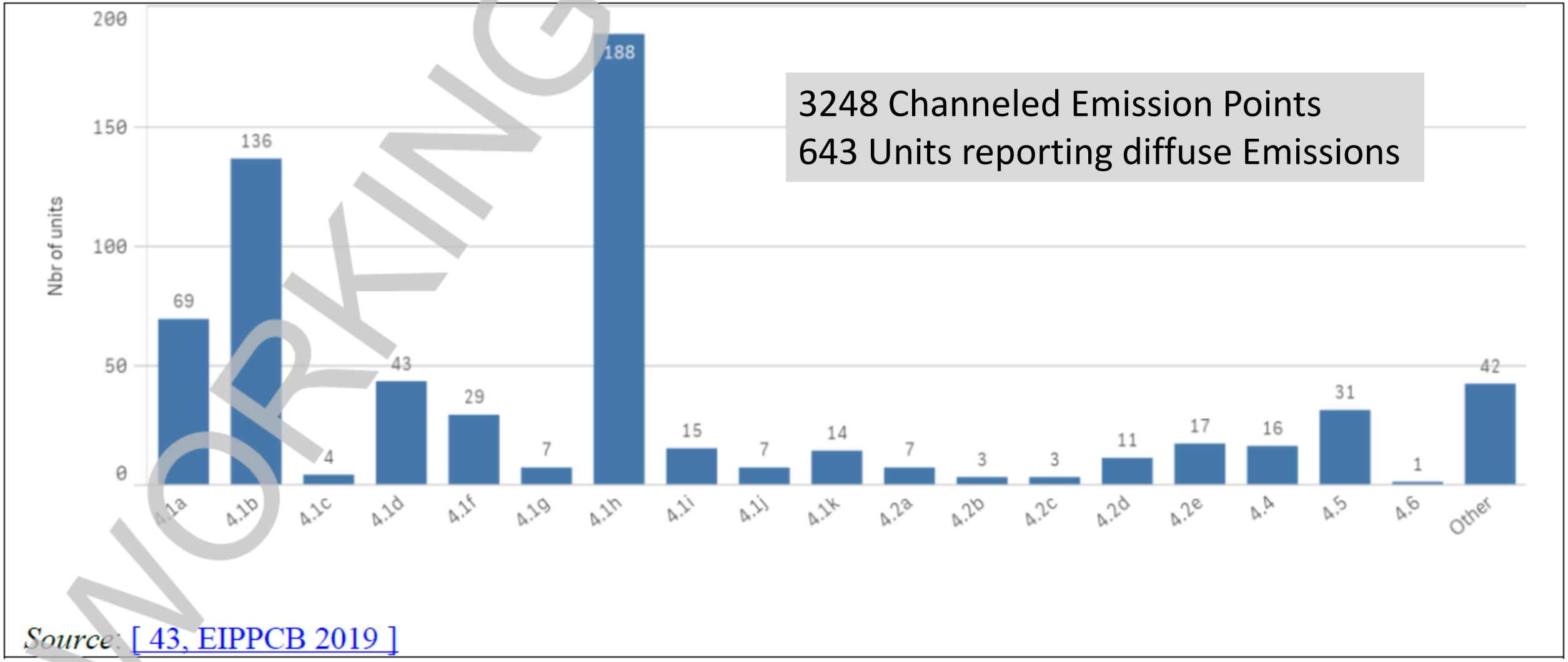
([1]) The upper end of the range is 250 mg/Nm^3 if the process off-gas(es) contain(s) high levels of NO_X precursors.

Substance/Parameter	BAT-AEL (mg/Nm^3) (Daily average or average over the sampling period)	Mass flow threshold (g/h)
Ammonia (NH_3)	2-30 ([1])	100
Carbon monoxide (CO)	No BAT-AEL ([2])	Not applicable
Elementary chlorine (Cl_2)	< 0.5-2	5
Gaseous fluorides, expressed as HF	< 1-2	
Hydrogen cyanide (HCN)	< 0.1-1	
Gaseous chlorides, expressed as HCl	< 1-10	50
Nitrogen oxides (NO_X)	50-150 ([3]) ([4])	1 000
Sulphur oxides (SO_X)	50-150 ([5])	

([1]) The BAT-AEL does not apply to channelled emissions to air of ammonia from the use of SCR or SNCR (see BAT 17).
([2]) As an indication, the emission levels for carbon monoxide are 20-100 mg/Nm^3, as daily average or average over the sampling period.
([3]) The upper end of the range is 300 mg/Nm^3 when NO_X are recovered from process off-gases to produce nitric acid.
([4]) The BAT-AEL does not apply to channelled emissions to air of NO_X from the use of catalytic or thermal oxidation (see BAT 15) or from process furnaces/heaters (see BAT 36).
([5]) The BAT-AEL does not apply in the case of physical purification or reconcentration of spent sulphuric acid.

WGC BREF Diffuse Emission

WGC BREF Diffuse Emission



Source: [43, EIPPCB 2019]

Figure 2.8: Number of units reported for diffuse emissions by IED category

WGC BREF Diffuse Emission – key BATs

BAT 19. In order to prevent or, where that is not practicable, to reduce diffuse VOC emissions to air, BAT is to elaborate and implement a management system for diffuse VOC emissions, as part of the environmental management system (see BAT 1), that includes all of the following features:

i. Estimating the annual quantity of diffuse VOC emissions (see BAT 20).
ii. Monitoring diffuse VOC emissions from the use of solvents by compiling a solvent mass balance, if applicable (see BAT 21).
iii. Establishing and implementing a leak detection and repair (LDAR) programme for fugitive VOC emissions. LDAR is carried out as a campaign, which typically lasts from 1 to 5 years.
iv. Establishing and implementing a detection and reduction programme for non-fugitive VOC emissions that includes all of the following features:
v. Establishing and maintaining a data base for keeping record
vi. Reviewing and updating the LDAR programme for the next campaign.
vii. Reviewing and updating the detection and reduction programme for non-fugitive VOC emissions. This includes all of the following:

WGC BREF Diffuse Emission

BAT 20. BAT is to estimate diffuse VOC emissions to air at least once every year by using a combination of the techniques given below, as well as to determine the uncertainty of this estimation. The estimation distinguishes between VOCs classified as CMR 1A or 1B and VOCs that are not classified as CMR 1A or 1B.

BAT 21. BAT is to monitor diffuse VOC emissions from the use of solvents by compiling, at least once every year, a solvent mass balance of the solvent inputs and outputs of the plant, as defined in Part 7 of Annex VII to Directive 2010/75/EU and to minimise the uncertainty of the solvent mass balance data by using all of the techniques given below.

Applicability

The technique may not be applicable to plants whose total annual consumption of solvents is lower than 50 tonnes. The level of detail of the solvent mass balance will be proportionate to the nature, scale and complexity of the plant, and the range of environmental impacts it may have, as well as to the type and quantity of solvents used.

WGC BREF Diffuse Emission

BAT 22. BAT is to measure diffuse VOC emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

Type of sources of diffuse VOC emissions (1) (2)	Type of VOCs	Standard(s)	Minimum measurement frequency
Sources of fugitive emissions	VOCs classified as CMR 1A or 1B	EN 15446	Once every year (3)
	VOCs not classified as CMR 1A or 1B		Once every LDAR campaign
Sources of non-fugitive emissions	VOCs classified as CMR 1A or 1B	No EN standard available	Once every year
	VOCs not classified as CMR 1A or 1B		Once every 5 years

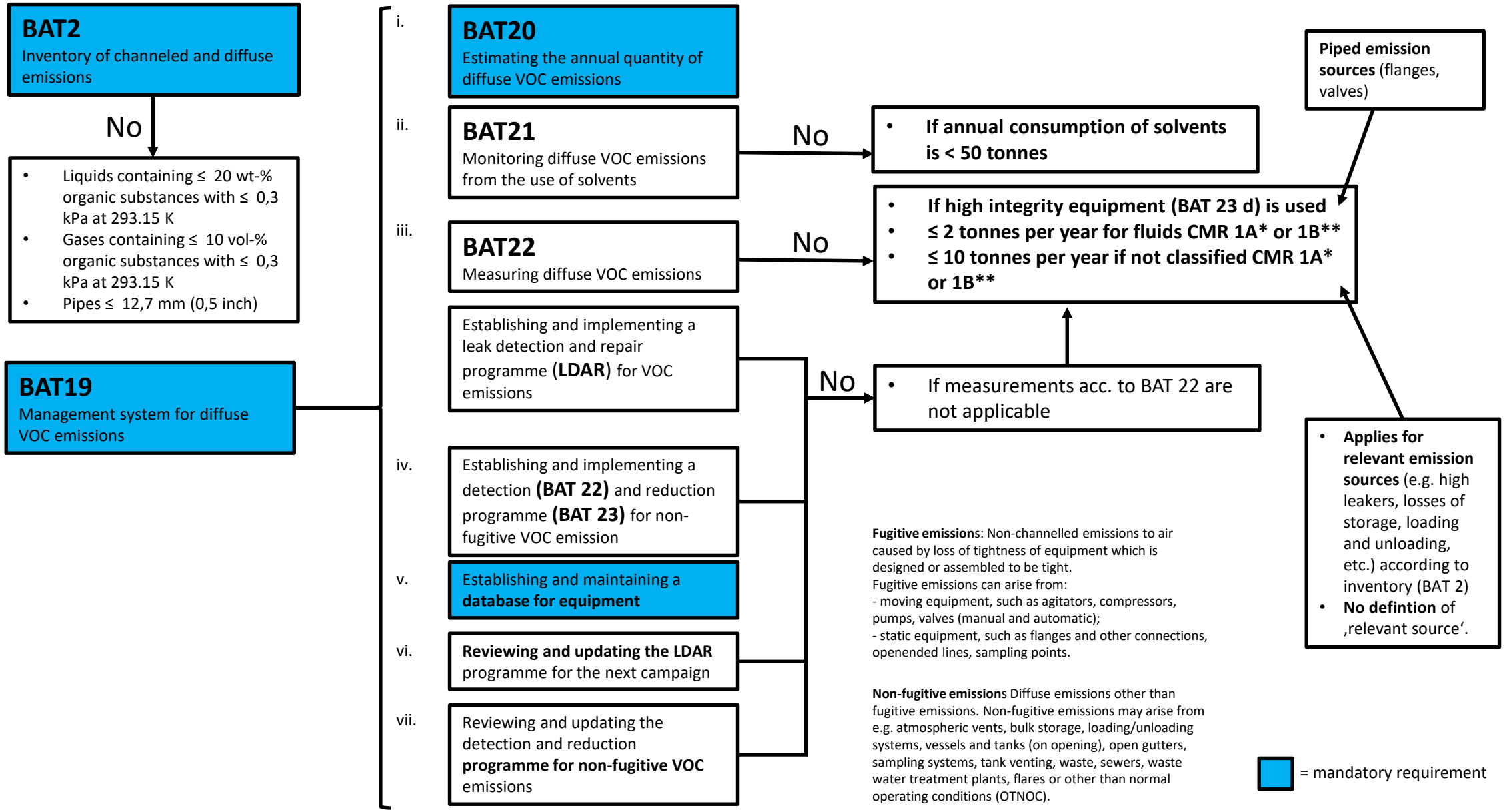
(1) The measurements only apply to emission sources that are identified as relevant in the inventory given in BAT 2.
(2) The measurements do not apply to high-integrity equipment (see BAT 23 d.) or to equipment operated under subatmospheric pressure.
(3) In the case of inaccessible sources of fugitive VOC emissions (e.g. if the measurements require the removal of insulation or the use of scaffolding), the measurement frequency may be reduced to once every LDAR campaign.

Applicability

BAT 22 only applies when the annual quantity of diffuse VOC emissions from the plant estimated according to BAT 20 is greater than:

- 2 tonnes per year in the case of VOCs classified as CMR 1A or 1B, or
- 10 tonnes per year in the case of VOCs not classified as CMR 1A or 1B.

WGC BREF Draft 1 - Diffuse Emissions BAT Overview



WGC BREF
Example for specific processes -- Polymers

WGC BREF Draft 1 - BATs/AELs for polymers

Table 4.8: BAT-associated emission levels (BAT-AELs) for total emissions to air of VOCs from the production of polyolefins

Polyolefin product	Unit	BAT-AEL (Yearly average)
HDPE	g VOCs per kg of polyolefin produced	0.3–1.8
LDPE		0.2–1.9
LLDPE		0.3–1.3
EVA copolymers		2.7–16
PP		0.2–2
GPPS and HIPS		< 0.085
EPS		< 0.6

The associated monitoring is given in BAT 8, BAT 20 and BAT 22.

As an alternative to the BAT-AELs in Table 4.8, the BAT-AELs in Table 4.9 may be used.

WGC BREF Draft 1 - BATs/AELs for polymers

Table 4.9: BAT-associated emission levels (BAT-AELs) for the monomer concentration in the polyolefin

Polyolefin product	Monomer(s)	Unit	BAT-AEL (Yearly average)
HDPE	Ethylene	g monomer per kg of polyolefin produced	< 0.5
LDPE			< 3
LLDPE			No BAT-AEL
EVA copolymers	Sum of ethylene and vinyl acetate		< 10
PP	Propylene		< 1
GPPS and HIPS	Styrene		No BAT-AEL
EPS			No BAT-AEL

Note: The monomer concentration in the polyolefin is measured after lowering the VOC content in the polymer (see BAT 25 b.).

The associated monitoring is given in BAT 24.

WGC BREF Draft 1
Timeline

- Cefic BREF IT skype meetings:
  - Dec 19, Feb 4, Feb 10, Feb 17
- Cefic BREF IT f2f/skype meetings:
  - Jan 16, Feb 24/25
- Polymers subteam meets Feb 3
- Internal Deadline for comments: Feb 20
- JRC Deadline for comments: Feb 28
- Commenting via online Batis tool/Excel File. Coordination by Cefic

- Data workshop May or June; Final Meeting end Q4 2020

WGC BREF Draft 1
TO DO

- Familiarize yourself with Draft 1
- Compare the BATs and AELs with the processes in your company and check, whether your company will be able to comply
- Report concerns and reasons to GZS (and Cefic)

Thank you for your attention

BACKUP

WGC: Key Environmental Issues IN Scope

- Carbon monoxide (CO)
- Nitrogen Oxides (NOx)
- Dust (including fine particulate matter PM10 and PM2.5)
- TVOC (NMVOC, TOC, VOC)
- Sulphur Oxides (SOx)
- Nitrous oxide (N_2O)
- Gaseous Chlorides (expressed as HCl)
- Elementary chlorine (Cl_2)
- Ammonia ($NH_{3)}$
- Tetrachloromethane (CCl_4)
- Benzene
- Formaldehyde
- Chloromethane
- Dichloromethane
- Trichloromethane
- Lead and its compounds (as Pb)
- Nickel and ist compounds (as Ni)
- PCDD/Fs (dioxins + furans)
- Hydrogen cyanide (HCN)
- Vinyl chloride monomer (VCM)
- Ethylene dichloride (EDC; 1,2-dichlorethane)
- Toluene
- Gaseous Fluoride (expressed as total F)
- Ethylene oxide
- Propylene oxide
- Carbon disulphide (CS2) (only Viscous production)
- Hydrogen sulphide (H2S) (only Viscous production)
- 1,3-Butadiene