



FEDERCHIMICA
CONFINDUSTRIA

BREF WGC: sintesi del prefinal Draft

Comitato Ambiente e Territorio
30 novembre 2021

WGC BREF

L'elaborazione del WGC BREF ha comportato:

➤ 2016 ÷ 2021:

- raccolta di informazioni e dati completi e rappresentativi sulle tecniche di abbattimento e sui livelli di emissione in tutta l'industria chimica (questionari);
- analisi approfondita delle informazioni e dei dati raccolti (Draft 1 e relativi commenti, Data workshop e web-closed CBI Data workshop);
- Final TWG Meeting e Prefinal Draft
- ✓ definizione di BAT generiche e BAT-AEL per le emissioni nell'aria per l'intera industria chimica, identificando nel contempo i processi che richiedono ulteriori considerazioni specifiche.



JRC SCIENCE FOR POLICY REPORT
**Best Available Techniques (BAT)
Reference Document for
Common Waste Gas
Management and Treatment
Systems in the Chemical Sector**



WGC BREF – Final Meeting

Principali risultanze emerse in occasione del Final TWG Meeting:

- Mantenuto approccio soglie di rilevanza: al superamento di definite soglie di flusso di massa devono essere applicati i BAT AELs di riferimento (significatività delle emissioni).
- Applicazione delle soglie di flusso di massa agli stack (e non ai punti di emissione) prevedendo, secondo il giudizio dell'Autorità Competente, la valutazione di aggregazione per i casi in cui i gas di scarico abbiano caratteristiche simili (ad es. contenenti stesse sostanze/parametri).
- Significativa riduzione di tutte le soglie di rilevanza, il testo parla di «*emissioni minori*» indicando il valore di soglia come esemplificativo e non mandatorio (e.g. 100 gC/h TVOC, Tab. 4.1).
- Intensificazione delle frequenze di monitoraggio (BAT8).
- Riduzione delle soglie di intervento/repair per impianti che abbiano già condotto campagne LDAR per il controllo delle emissioni fuggitive (BAT19). Target di 100 ppmv per flussi classificati CMR 1A/1B.
- Introdotta il concetto di monitoraggio in luogo della misura delle emissioni diffuse non fuggitive (BAT22).



For the purpose of calculating the mass flows in relation to BAT8, BAT11 (Table 4.1), BAT 14 (Table 4.3), BAT16 (Table 4.4), BAT 18 (Table 4.6), BAT26, BAT 29 (Table 4.10), BAT33 and BAT 36 (Table 4.17), where waste gases from one type of source (e.g. process furnaces/heaters) with similar characteristics, e.g. containing the same (type of) substances/parameters, and discharged through two or more separate stacks could, in the judgement of the competent authority, taking technical and economic factors into account, be discharged through a common stack, these stacks shall be considered as a single stack.



○Maintenance and/or repair actions: Definition of a VOC concentration threshold above which equipment maintenance is to be carried out. A typical criterion could be a VOC concentration threshold triggering the maintenance or repair action (maintenance/repair threshold). The maintenance/repair threshold is generally equal to or higher than the leak threshold. This depends on the characteristics of the emission source (e.g. accessibility) and the hazardous properties of the emitted substance(s). For the first LDAR programmes, it is generally not higher than 40 000 5 000 ppmv for VOCs other than VOCs classified as CMR 1A or 1B, and 1 000 ppmv for VOCs classified as CMR 1A or 1B. For subsequent LDAR programmes, the maintenance/repair threshold is lowered (see point vi. a.) and not higher than 1 000 ppmv for VOCs other than VOCs classified as CMR 1A or 1B, and 500 ppmv for VOCs classified as CMR 1A or 1B, targeting 100 ppmv.

WGC BREF – Estratti da Prefinal Draft

BAT 8

BAT is to monitor channelled 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.
Definizione delle frequenze di monitoraggio.

- Intensificazione delle frequenze di monitoraggio.
- Prevista misura in continuo per parametri aventi flussi di massa maggiori a soglie definite.
- Introdotto riferimento a sostanze CMR diverse da quelle previste in Tabella (KEI).

Substance/Parameter ⁽¹⁾	Process(es)/Source(s)	Emission points	Standard(s) ⁽²⁾	Minimum monitoring frequency	Monitoring associated with
Ammonia (NH ₃)	Use of SCR/SNCR	All-emission points	No EN standard available. EN 21877	Once every 6 months ⁽³⁾ ⁽⁴⁾ ⁽⁵⁾ ⁽⁶⁾	BAT 17
	All other processes/sources	Any stack		Once every 6 months ⁽³⁾ ⁽⁴⁾ ⁽⁵⁾ ⁽⁶⁾	BAT 18
Benzene	All processes/sources	All-emission points Any stack	No EN standard available	Once every 6 months ⁽³⁾ ⁽⁴⁾ ⁽⁵⁾ ⁽⁶⁾	BAT 11
1,3-Butadiene	All processes/sources	All-emission points Any stack	No EN standard available	Once every 6 months ⁽³⁾ ⁽⁴⁾ ⁽⁵⁾ ⁽⁶⁾	BAT 11
Carbon monoxide (CO)	Thermal treatment	All-emission points Any stack with a CO mass flow of ≥ 2 kg/h	Generic EN standards ⁽⁷⁾	Continuous	BAT 16
		All-emission points Any stack with a CO mass flow of < 2 kg/h	EN 15058	Once every 6 months ⁽³⁾ ⁽⁴⁾ ⁽⁵⁾ ⁽⁶⁾	
	Process furnaces/heaters	All-emission points Any stack with a CO mass flow of ≥ 2 kg/h	Generic EN standards ⁽⁷⁾	Continuous ⁽⁷⁾	BAT 36
		All-emission points Any stack with a CO mass flow of < 2 kg/h	EN 15058	Once every 6 months ⁽³⁾ ⁽⁴⁾ ⁽⁵⁾ ⁽⁶⁾	

- (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 3 years if the emission levels are proven to be sufficiently stable.
- (3bis) The minimum monitoring frequency may be reduced to once every year or once every 3 years if the emission levels are proven to be sufficiently stable.
- (3ter) The minimum monitoring frequency may be reduced to once every year 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.
- (6) In the case of batch processes, measurements are carried out according to EN 15259.
- (7) In the case of process furnaces/heaters with a total rated thermal input of less than 100 MW operated less than 500 hours per year, the minimum monitoring frequency may be reduced to once every year.
- (8) In the case of the production of polyolefins, the monitoring of TVOC emissions from finishing steps (e.g. drying, blending) and from polymer storage may be replaced/complemented by the monitoring in BAT 24 if it provides a better representation of the TVOC emissions.
- (9) In the case of the production of synthetic rubbers, the monitoring of TVOC emissions from finishing steps (e.g. extrusion, drying, blending) and from synthetic rubber storage may be replaced/complemented by the monitoring in BAT 31 if it provides a better representation of the TVOC emissions.
- (10) i.e. other than benzene, 1,3-butadiene, chloromethane, dichloromethane, ethylene dichloride, ethylene oxide, formaldehyde, propylene oxide, tetrachloromethane, toluene, trichloromethane.
- (11) The minimum monitoring frequency may be reduced to once every 6 months if the emission levels are proven to be sufficiently stable.

WGC BREF – Estratti da Prefinal Draft

BAT 11	<p>In order to reduce channelled emissions to air of organic compounds, BAT is to use <u>one or a combination</u> of the techniques given below.</p> <p>Identificazione di tecniche di trattamento dei VOC (Adsorption, Absorption, Catalytic Oxidation, Condensation, Thermal Oxidation, Bioprocesses) e definizione di flussi di massa e BAT-AELs.</p>	<ul style="list-style-type: none"> ➤ Riduzione delle soglie di rilevanza. ➤ Introduzione di BAT-AELs per la somma dei VOC classificati CMR.
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Table 4.1: BAT-associated emission levels (BAT-AELs) for channelled emissions to air of organic compounds

Substance/Parameter	BAT-AEL (mg/Nm ³) (Daily average or average over the sampling period) ⁽¹⁾	Mass flow threshold (g/h)
Total volatile organic carbon (TVOC)	< 1-20 ⁽¹⁾ ⁽²⁾ ⁽³⁾ ⁽⁴⁾ ⁽⁵⁾ ⁽⁶⁾	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
Sum of VOCs classified as CMR 1A or 1B	< 1-5 ^(4bis)	
Sum of VOCs classified as CMR 2	< 1-10 ^(5bis)	
Benzene	< 0.5-1 ⁽⁷⁾	2-5
1,3-Butadiene	< 0.5-1 ⁽⁸⁾	2-5
Ethylene dichloride	< 0.5-1 ⁽⁹⁾	2-5
Ethylene oxide	< 0.5-1 ⁽⁹⁾	2-5
Propylene oxide	< 0.5-1 ⁽⁹⁾	2-5
Formaldehyde	1-5 ⁽⁹⁾	2-5
Chloromethane	< 0.5-1 ⁽⁹⁾ ⁽¹⁰⁾ ^(10bis)	100
Dichloromethane	< 0.5-1 ⁽⁹⁾ ⁽¹⁰⁾	100
Tetrachloromethane	< 0.5-1 ⁽⁹⁾ ⁽¹⁰⁾	100
Toluene	< 0.5-1 ⁽⁹⁾ ⁽¹⁰⁾ ^(10bis)	100
Trichloromethane	< 0.5-1 ⁽⁹⁾ ⁽¹⁰⁾	100

- ⁽¹⁾ TVOC is expressed in mg C/Nm³.
- ⁽²⁾ In the case of polymer production, the BAT-AEL may not apply to emissions from the finishing steps (e.g. extrusion, drying, blending) and from polymer storage.
- ⁽³⁾ The BAT-AEL does not apply to minor emissions (i.e. when the TVOC mass flow is below e.g. 100 200 g C/h) if no CMR substances are identified as relevant in the waste gas stream based on the inventory given in BAT 2.
- ⁽⁴⁾ The upper end of the BAT-AEL range is 5 mg C/Nm³ if both of the following conditions are fulfilled:
- the presence of substances classified as CMR 1A/1B in TVOC is identified as relevant (see BAT 2);
 - the TVOC mass flow is above 2-5 g C/h.
- ⁽⁴⁾ The upper end of the BAT-AEL range is 10 mg C/Nm³ if both of the following conditions are fulfilled:
- the presence of substances classified as CMR 2 in TVOC is identified as relevant (see BAT 2);
 - the TVOC mass flow is above 50 g C/h.
- ^(4bis) The BAT-AEL does not apply to minor emissions (i.e. when the mass flow of the sum of the VOCs classified as CMR 1A or 1B is below e.g. 1 g C/h).
- ^(5bis) The BAT-AEL does not apply to minor emissions (i.e. when the mass flow of the sum of the VOCs classified as CMR 2 is below e.g. 50 g C/h).
- ⁽⁶⁾ The upper end of the BAT-AEL range may be higher and up to 40 mg/Nm³ when using bioprocesses if both of the following conditions are fulfilled:
- the presence of substances classified as CMR 1A/1B or CMR 2 is identified as not relevant (see BAT 2);
 - the TVOC abatement efficiency of the waste gas treatment system is ≥ 70 %.
- ⁽⁷⁾ The upper end of the BAT-AEL range may be higher and up to 50 30 mg/Nm³ when using techniques that allow the recovery of materials (e.g. solvents, see BAT 9), if both of the following conditions are fulfilled:
- the presence of substances classified as CMR 1A/1B or CMR 2 is identified as not relevant (see BAT 2);
 - the TVOC abatement efficiency of the waste gas treatment system is ≥ 95 %.
- ⁽⁸⁾ The BAT-AEL does not apply to minor emissions (i.e. when the mass flow of the substance concerned is below e.g. 2-5 g/h).
- ⁽⁹⁾ The BAT-AEL does not apply to minor emissions (i.e. when the mass flow of the substance concerned is below e.g. 50 g/h).
- ⁽¹⁰⁾ The upper end of the BAT-AEL range may be higher and up to 20 15 mg/Nm³ when using techniques that allow the recovery of materials (e.g. solvents, see BAT 9), if the abatement efficiency of the waste gas treatment system is ≥ 95 %.
- ^(10bis) The upper end of the BAT-AEL range may be higher and up to 20 mg/Nm³ when using techniques to recover toluene (see BAT 9), if the abatement efficiency of the waste gas treatment system is ≥ 95 %.
- ^(10bis) The upper end of the BAT-AEL range may be higher and up to 40 mg/Nm³ when using bioprocesses if the abatement efficiency of the waste gas treatment system is ≥ 70 %.
- ⁽¹²⁾ For activities listed under points 8 and 10, Part 1 of Annex VII of the IED, the BAT-AEL ranges only apply to the extent that they lead to lower emission levels than the emission limit values in part 2 and 4 of Annex VII of the IED.

WGC BREF – Estratti da Prefinal Draft

BAT 16	<p>In order to reduce channelled emissions to air of CO, NO_x and SO_x from thermal treatment, BAT is to use <u>technique c. and one or a combination of the other techniques given below.</u></p> <p>Identificazione di tecniche di trattamento NO_x, SO_x e CO da trattamenti termici e rispetto dei BAT AELs attraverso l'applicazione delle tecniche indicate (Choice of fuel, Low-NO_x burner, <u>Optimisation of catalytic thermal oxidation</u>, Removal of high levels of NO_x precursors, Absorption, SCR, SNCR).</p>	<ul style="list-style-type: none"> ➤ Eliminazione della soglia di rilevanza per NO_x. ➤ Riduzione BAT-AELs NO_x, inclusi i casi in cui siano presenti alti livelli di precursori di NO_x.
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Table 4.4: BAT-associated emission levels (BAT-AELs) for channelled emissions to air of NO_x and indicative emission level for channelled emissions to air of CO from the use of ~~catalytic or thermal oxidation~~ thermal treatment

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	5 10 -50 30 ⁽²⁾ ⁽⁴⁾	1-000
Nitrogen oxides (NO _x) from thermal oxidation	5 10 50 - 150 130 ⁽²⁾ ⁽¹⁾	1-000
Carbon monoxide (CO)	No BAT-AEL ⁽²⁾	Not-applicable

⁽¹⁾ The upper end of the BAT-AEL range ~~is~~ may be higher and up to ~~250~~ 200 mg/Nm³ if the process off-gas(es) contain(s) high levels of NO_x precursors.

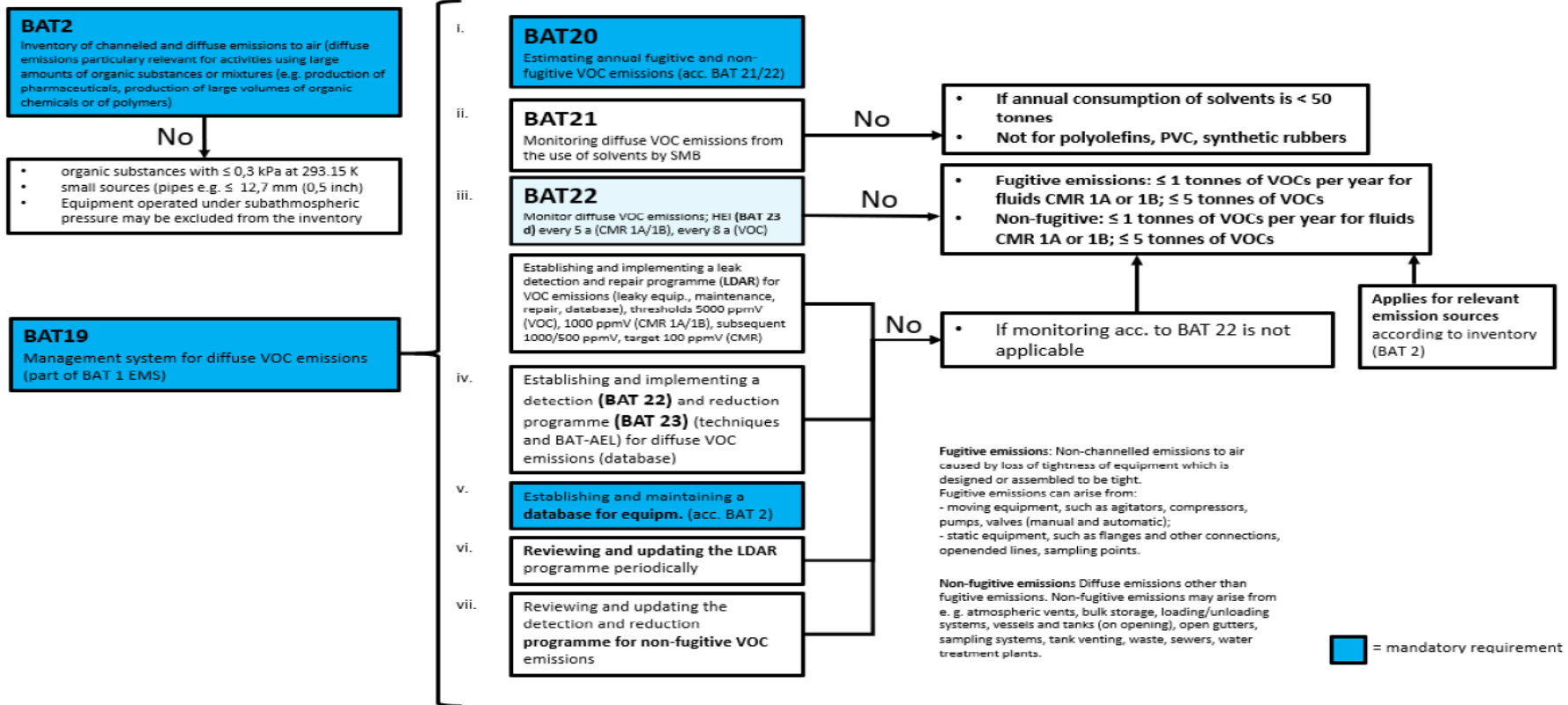
⁽²⁾ As an indication, the emission levels for carbon monoxide are 4-50 mg/Nm³, as a daily average or average over the sampling period.

⁽³⁾ ~~The BAT-AEL does not apply when the NO_x mass flow is below 1-000 g/h.~~

⁽⁴⁾ The upper end of the BAT-AEL range may be higher and up to ~~100~~ 80 mg/Nm³ if the process off-gas(es) contain(s) high levels of NO_x precursors.

WGC BREF – Estratti da Prefinal Draft

4.1.4 Diffuse VOC emissions to air (BAT 19 – 23) **Final Meeting**



WGC BREF – Estratti da Prefinal Draft

BAT 19	<p>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 EMS (see BAT 1), that includes all of the following features [...]</p> <p>Il punto iii disciplina i programmi per le emissioni fuggitive di emissioni di VOC esplicitando i criteri per la definizione di perdita e di intervento di manutenzione/riparazione.</p> <p>Il punto iv definisce i criteri per la riduzione delle emissioni di VOC non-fuggitive (vedi anche BAT 22)</p>	<ul style="list-style-type: none">➤ Riduzione delle soglie di intervento/repair per impianti che abbiano già condotto campagne LDAR per il controllo delle emissioni fuggitive➤ Introduzione target 100 ppmv come soglia per interventi di mtz durante le campagne LDAR per fluidi contenenti VOC classificati CMR 1A/1B➤ Introdotta monitoraggio in luogo della misura delle emissioni diffuse non fuggitive (vedi BAT22).
BAT 22	<p>BAT is to <u>monitor</u> 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.</p>	<ul style="list-style-type: none">➤ Introdotta monitoraggio in luogo della misura delle emissioni diffuse non fuggitive.

WGC BREF – Estratti da Prefinal Draft

<p>BAT 24</p> <p>BAT 25</p>	<p>BAT is to monitor the TVOC concentration in polyolefin products, at least once every year for each representative polyolefin grade produced during the same year, 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.</p> <p style="text-align: center;">*****</p> <p>In order to increase resource efficiency and to reduce emissions to air of organic compounds, BAT is to use <u>all of the techniques</u> given below, as far as applicable.</p> <p>(Chemical agents with low boiling points, Lowering the VOC content in the polymer, Collection and treatment of process off-gases)</p>	<ul style="list-style-type: none"> ➤ BAT specifiche per la produzione di poliolefine. ➤ Identificazione in Tabella 4.8 di BAT-AELs come specific emission loads.
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Polyolefin product	Polyolefin monomer(s)	Standard(s)	Minimum monitoring frequency	Monitoring associated with
HDPE, LDPE, LLDPE	Ethylene	No EN standard available	Once every month	BAT 20, BAT 25
LDPE				
LLDPE				
EVA copolymers	Ethylene and vinyl acetate			
PP	Propylene			
EPS, GPPS, HIPS	-			

Table 4.8: BAT-associated emission levels (BAT-AELs) for total emissions to air of ~~VOC~~ VOCs from the production of polyolefins expressed as specific emission loads

Polyolefin product	Unit	BAT-AEL (Yearly average)
HDPE	g VOCs C per kg of polyolefins produced	0.3 – 1.0 ⁽¹⁾
LDPE		0.2 – 1.0 0.1 – 1.4 ⁽²⁾ ^(2b)
LLDPE		0.3 – 1.2 0.1 – 0.8
EVA copolymers		2.7 – 16
PP		0.2 – 2 0.1 – 0.9 ⁽¹⁾
GPPS and HIPS		< 0.005 0.1
EPS	< 0.6	

⁽¹⁾ The lower end of the BAT-AEL range is typically associated with the gas-phase polymerisation process.
⁽²⁾ The upper end of the BAT-AEL range may be higher and up to 2.7 g C/kg in the case of the production of LDPE copolymers EVA or other copolymers (e.g. ethyl acrylate copolymers).
^(2b) The upper end of the BAT-AEL range may be higher and up to 4.7 g C/kg if both of the following conditions are met:

- thermal oxidation is not applicable;
- EVA or other copolymers (e.g. ethyl acrylate copolymers) are produced.

BREF WGC – Next steps



I prossimi passi :

- **Dicembre 2021:** raccolta commenti al Prefinal Draft ed emissione Final Draft;
- **1° trimestre 2022:** sottoporre il Final Draft al Forum di cui all'Art. 13 della Direttiva IED con aggiornamento delle BAT Conclusions sulla base delle risultanze emerse in occasione del Final TWG Meeting;
- **2° trimestre 2022:** sottoporre il capitolo sulle BAT Conclusions al Comitato di cui all'Art. 75 della Direttiva IED;
- **3° trimestre 2022:** traduzione e pubblicazione delle BAT Conclusions nell'Official Journal of the European Union.

Punti di attenzione:

- “... Entro quattro anni dalla data di pubblicazione delle decisioni sulle conclusioni per le BAT... relative all'attività principale di un'installazione, l'AC garantisce che:
 - ❖ tutte le condizioni di autorizzazione per l'installazione interessata siano riesaminate e, se necessario, aggiornate per assicurare il rispetto della presente direttiva, in particolare, se applicabile, dell'articolo 15, paragrafi 3 e 4;
 - ❖ l'installazione sia conforme a tali condizioni di autorizzazione.”