
EUROMOT POSITION

30 May 2018

Feedback on German MCPD 2015/2193 Implementation Proposal dated 30.04 2018

1. Introduction

German Environmental Ministry published the draft proposal “Referentenentwurf des Bundesministeriums für Umwelt, Naturschutz und nukleare Sicherheit. Verordnung zur Einführung der Verordnung über mittelgroße Feuerungsanlage sowie Änderung der Verordnung über kleine und mittlere Feuerungsanlagen” /1/ dated 30.04 2018 for commenting. We have studied the new proposal in detail and note that some of the issues present in the September 2016 “Entwurf zur Anpassung der Ersten Allgemeinen Verordnungsverordnung zum Bundes-Immissionsschutzgesetz (Technische Anleitung zur Reinhaltung der Luft – TA Luft)” /2/ have been corrected but many concerns remain.

Of the remaining main concerns can be mentioned:

- Still some of the proposed limits do not represent “Stand der Technik” for the bigger liquid fired engines.
- Some derogation texts present in the EU MCPD 2015/2193 for exceptional conditions are missing in the proposal.

Below our remaining concerns are briefly described and solutions are proposed. Texts is divided in a common and emission limit sections

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A Non Governmental Organisation in observer status with the UN Economic Commission for Europe (UNECE) and the UN International Maritime Organisation (IMO)

2. Common aspects

2.1. Exclusion of test plant

The meaning of the MCPD 2015/2193 Article 2(4) exact exclusion text for R&D plants to be inserted into the proposal /1/. Proposal /1/ text in Article 1(15) as it stands now is too narrow. Same wording as in MCPD 2015/2193 to be used in German proposal in order to avoid mistakes.

2.2. Emission concentration O₂- % reference point

In article 3 the reference O₂-% points stipulated for “Fuerungsanlage”, gas turbine and combustion engine plant. According to article 2(15) “Fuerungsanlage” means any plant in which fuels are oxidized in order to use the heat generated, i.e. includes boiler, gas turbine and combustion engine plants. Article 2(20) “Mittelgrosse Feuerungsanlage” is a boiler plant when gas turbine and combustion engines are clearly excluded. Thus word “Fuerungsanlage” in the article 3 *should be substituted by word “Mittelgrosse Feuerungsanlage”* for clarity.

The emission concentration point 15vol- % O₂ in the EU MCPD 2015/2193 for the combustion engine has in the German proposal been changed to 5 vol-% O₂-%. Combustion engine industry has in earlier comment submissions e.g. amongst all in documents by VDMA in December 2016 to the Environmental Ministry explained the importance of the 15 vol-% O₂ reference point for combustion engine plants.

All other prime mover technologies such as boilers and gas turbines have emission concentration points which are close to the actual conditions of the flue gas, e.g. a gas fired boiler 3 vol-% O₂ and a gas fired gas turbine 15 vol-% O₂. Around the World it is common praxis e.g. World Bank/International Finance Corporation, USA, South Africa, India, EU Directives, etc, to use the 15 vol-% O₂ reference point for (bigger) stationary reciprocating (combustion) engines. This is a logical approach, see brief description in Euromot document /3/.

By setting the reference point to 5 vol-% O₂ the combustion engine technology will be unfairly treated (heavily “discriminated”) compared to other prime movers and big misunderstandings occur. In below text will be shown some examples what this artificial reference point of 5 vol-% O₂ for combustion engines will have as consequences.

The reference point for a combustion plant shall be set to 15 vol-% O₂ as in the MCPD 2015/2193 in order to secure a fair treatment of the combustion engine plant.

2.3. SO_x (SO₂ + SO₃)

In the proposal /1/ a SO_x limit the sum of sulphur dioxide and trioxide emissions is stipulated. To note is that in MCPD 2015/2193 in Annex II (stated in Article 1) and in LCP BREF 2017 BAT document /6/ only SO₂ limits are set not SO_x.

Only a SO₂ limit should be set not a SO_x..SO₃ is work some to measure and should not

be enforced on a smaller plants.

2.4. Missing MCPD 2015/2193 derogation texts

In the German proposal /1/ are missing following derogations included in the EU MCPD 2015/2193 Directive Article 6(12) and 6(11) texts:

Article 6(12): *"The competent authority may grant a derogation from the obligation to comply with the emission limit values provided for in paragraphs .. and .. in cases where a medium combustion plant using only gaseous fuel has to resort exceptionally to the use of other fuels because of a sudden interruption in the supply of gas and, for this reason, would need to be equipped with secondary abatement equipment. The period for which such a derogation is granted shall not exceed ten days except where the operator demonstrates to the competent authority that a longer period is justified."*

Article 6(11): *" The competent authority may grant a derogation for a maximum period of six months from the obligation to comply with the emission limit values provided for in paragraphs ... and .. for SO₂ in respect of a medium combustion plant which normally uses low-sulphur fuel, in cases where the operator is unable to comply with those emission limit values because of an interruption in the supply of low-sulphur fuel resulting from a serious shortage. "*

The UNECE Gothenburg Protocol (not in force yet, accepted by Germany September 2017) /5/ is containing a similar (but clearer) text than the MCPD Article 6(12) such as: *"A Party may derogate from the obligation to comply with the emission limit values for combustion plants using gaseous fuel which have to resort exceptionally to the use of other fuels because of a sudden interruption in the supply of gas and for this reason would need to be equipped with a waste gas purification facility. The exception time period shall not exceed 10 days except where there it is an overriding need to maintain energy supplies"* and thus this text is preferred.

These derogations are very important because by this the power/heat supply is secured and investments in unnecessary expensive/complicated secondary abatement techniques is avoided (a BAT cost-benefit balance fulfilment).

At least a text similar to the one in Article 6(12) of the EU MCPD shall be included in the proposal (now missing) in order to enable reasonable efficient means available how to act in sudden arising emergency situations, see e.g. article /11/. Similar texts can also be found in IED 2010/75/EU /4/.

2.5. Admission of Exceptions

According to article 31 the administrator can grant on bases of an application by the operator exceptions depending on the special circumstances for the individual case:

- Requirements cannot be fulfilled or only by excessive efforts
- Emission requirement in general is beyond "Stand der Technik"

- Exceptions are not in conflict with IED 2010/75/EU nor MCPD 2015/2193
- etc.

This article could in theory be of help e.g. solving the particulate dilemma (see below item 3.3) for the bigger liquid fired engine and above missing derogation text (see item 2.4).

In order to have a clear and effective ruling items such as 2.4, 3.3 “corrections” need to be added to the proposal and avoid the case by case approach which would be very burdensome and costly for all parties with an uncertain outcome and thus not a long term sustainable solution.

2.6. Section 2 (Requirements for construction and operation)

In supporting material document /7/ background text for section 2 (“Zu Abschnitt 2 (Anforderungen an die Errichtung und den Betrieb)”) (page 55) is a requirement stated that TA-LUFT set emission limits additionally apply if proposal /1/ has not specified otherwise. In particular requirements for inorganic particulate and carcinogenic substances apply.

Transposition of the MCPD is for legacy reasons and TA-LUFT is put into a new BImSchV. For clarity a plant manufacturer should preferable have to deal with only one ruling and no parallel ruling leading to confusions should apply.

Therefore we propose this paragraph to be deleted. If this cannot be done the pragmatic approach seen in BImSchV 13 for the liquid fired boiler approach is recommended. See discussion in Annex II of this paper on these substances for an “other liquid fuel” category. For a clean fuel such as (DIN 51603 Teil 1, Ausgabe März 2017) diesel oil the approach should be leaner. Preference is that valid emission limit (if regulated) should be clearly stated in an Annex to the proposed ruling, references TA-LUFT should be avoided for clarity.

3. Emission Limits

3.1. Ammonia

In article 8(1) is stated that the ammonia emission limit is maximum 10 mg/Nm³. The proposed ammonia slip limit seems to equal to the upper span ammonia BAT associated emission level (AEL) in BAT 7 of the LCP BREF /6/ chapter 10.1.3 for a big plant ≥ 50 MWth. In the LCP BREF the emission concentration oxygen reference point is 15 vol-% O₂ for both the combustion engine and the gas turbine. In article 16 of the proposal /1/ is not given at which reference O₂-% the ammonia limits to be implemented on. In the draft 2016 /2/ chapter 5.4.1.4.1.2a/5.4.1.4.2.2a (page 125 →) the ammonia limit was set to 10 mg/Nm³ and reference points set to 5 % O₂ for the combustion engine. In chapter 5.4.1.4.1.2b/5.4.1.4.2.2b /2/ the ammonia slip limit was set to 10 mg/Nm³ (15 % O₂) for the gas turbine plant.

As a consequence of the artificial oxygen reference 5 vol-% O₂ the combustion engine has then an ammonia limit prescribed which is $(21-5)/(21-15)$ =about 2.7 *times stricter set* than for the

competing technology. The combustion engine ammonia limit 10 mg/Nm^3 (5 % O_2) = about 3.8 mg/Nm^3 (15 % O_2), i.e. for the combustion engine the ammonia limit is set close to the lower BAT associated span limit of the LCP BREF but for the gas turbine at the maximum span limit. Efficient (bigger expensive) oxidation catalysts are also to be installed which has to be more frequently exchanged when their reactivity has decreased with time. Chapter 10.3.2.2 BAT 33 /6/ text “*The applicability may be limited by the sulphur content of the fuel*” limits application of the oxidation catalyst.

“. In LCP BREF has therefore in BAT 7 for oil fired engines been incorporated a higher max ammonia BAT-AEL of 15 mg/Nm^3 (15 % O_2) = 40 mg/Nm^3 (5 % O_2).

The ammonia limit set for the combustion engine plant is to be raised to about 10 mg/Nm^3 (15 % O_2) (= 30 mg/Nm^3 (5 % O_2)) due to the artificial 5 % O_2 emission concentration reference to be a pair with the gas turbine ammonia corresponding limit of 10 mg/Nm^3 (15 % O_2); i.e. retain the TA-LUFT 2002 limit; and close to the BAT-AEL conclusions set for a big plant in LCP BREF /6/ or “Stand der Technik”. This is amongst all needed in order to avoid very frequent catalyst changes.

3.2. SO_2

In article 16(8) a SO_x limit is set for gas fired combustion engines. A reference is made to article 13(4) and in the text is stated that reference O_2 -% for the combustion engine is 5 vol-% O_2 . The gas turbine has in article 15(10) a similar provision but reference point is 15 vol-% O_2 . E.g. the combustion engine SO_x limit for natural gas mode is 10 mg/Nm^3 (5 % O_2) = about 3.8 mg/Nm^3 (15 % O_2) which is almost 2.7 times stricter than for the natural gas fired gas turbine. *The gas shall preferable (this is a cost effective way) be desulphurized by the gas supply distributor at a central facility before distribution to the consumers.*

In the EU MCPD 2915/2193 no SO_2 limit was set for natural gas. The same approach is recommended for the German implementation proposal /1/ and by this all different prime movers should have an equal treatment.

3.3. Particulate

In articles 16(2) particulate emission limits for gas oils, alcohols and vegetable based oils (DIN 51603 Teil 1, Ausgabe März 2017; methanol, ethanol, etc) and for other liquids in article 16(3).

DIN 51603 Teil 1, Ausgabe März 2017; methanol, ethanol,etc. limits:

- 5 mg/Nm^3 (5 % O_2) = about 1.9 mg/Nm^3 (15 % O_2).

For other liquid fuels such as heavy fuel oil (HFO) the limit is set as (reference to article 10(3)):

- 10 mg/Nm^3 (5 % O_2) = about 3.7 mg/Nm^3 (15 % O_2), plant $\geq 20 \text{ MWth}$
- 20 mg/Nm^3 (5 % O_2) = about 7.5 mg/Nm^3 (15 % O_2), plant $< 20 \text{ MWth}$.

In article 16(4) is stipulated that a new liquid fired emergency unit has to be equipped with a

diesel particulate filter (DPF – “Russfilter”) which is said to be “Stand der Technik”, limit value is max 5 mg/Nm³ (5 % O₂) = about 1.9 mg/Nm³ (15 % O₂).

In the supporting material document /7/ chapter “zu 16 (Emmissionsgrenzwerte für Verbrunnungsmotoranlagen) Absatz 2 zu Absatz 2” page 63 reasoning for the above sets limits are given. It is amongst all stated that for liquid fuel fired combustion engines DPF is “Stand der Technik”. As bases for this statement is referred to “Verordnung über kleine und mittlere Feuerungsanlagen dated 26th January 2010 (BGBl. I S. 38) with changed article 16 (4) dated March 10th 2017 (BGBl. I S. 420), where is stated that 5 mg/m³ particulate limit is achievable with a DPF. This document is same as BImSchV 1. According to source /8A/ BImSchV1 is a ruling intended for combustion plants which do not have to be registered (“*nicht unter die Genehmigungspflicht des § 4 BImSchG fallen*”) e.g. for very small < 120, 120 .. 400 and > 499 kWth (boiler) plants /8B/. I.e. this reference is not applicable at least on bigger (> 15 MWth) combustion engine units !

In LCP BREF 2017 /6/ introduction chapter “Scope” is stated “ .. This document does not address the following: combustion of fuels in units with a rated thermal input of less than 15 MW “, in chapter 10.3.2.4 in “BAT 35” BAT (=“ Stand der Technik”) following abatement techniques for particulate emissions are listed as (note also limitations mentioned of the applicability):

- Fuel choice
- Electrostatic Precipitator (ESP)
- Bag Filter

Note DPF is not even mentioned in the LCP BREF document when it is NOT applicable on bigger combustion engine units ! This can also be seen from following text in UNECE document /9/ chapter OO. “ .. (Remark: Diesel Particulate Filters (DPF) used on heavy duty vehicles and small off road engines are not yet suitable for large stationary diesel engines covered by the guidance document (larger > 5 MWth). Particulate traps are indeed used in many diesel cars and trucks running on clean diesel fuel for filtering off particulates/soot. .. “ !

In LCP BREF 2017 the following particulate limits for a new gas oil/HFO fired combustion plant (for an existing plant limits are higher set):

- Daily average value: 10 .. 20 mg/Nm³ (15 % O₂) = about 27 ..53 mg/Nm³ (5 % O₂)
- Yearly average value: 5 .. 10 mg/Nm³ (15 % O₂) = about 13.4 ..26.7 mg/Nm³ (5 % O₂)

I.e. current TA-LUFT 2002 particulate limit of 20 mg/Nm³ (5 % O₂) = about 7.5 mg/Nm³ (15 % O₂) is already in compliance with the “brand new” LCP BREF 2017, which represents BAT for bigger plants using combustion engine units \geq 15 MWth !

In Annex I (of this paper) is shown that the proposed particulate limit of 5 mg/Nm³ (5 % O₂) = about 1.9 mg/Nm³ (15 % O₂) is not possible to measure in a reliable way for a bigger combustion engine unit. It is shown that the particulate limit should preferable not be below 7.5 mg/Nm³ (15 % O₂) (= 20 mg/Nm³ (5 % O₂)) for a bigger combustion engine unit !

Holland adopted the MCPD 2015/2193 /10/ particulate limit of 10 mg/Nm³ (15 % O₂) and changed the reference oxygen point of the combustion engine from 3 to 15 % O₂ when implementing the MCPD Directive (see table 1.10e in the document for engines > 5 MWth).

In the German proposal document /1/ is missing important derogation texts (see above item 2.4) needed in order to have practical means to maintain a meaningful BAT cost/benefit approach in “sudden” emergency situations.

Proposed particulate limits /1/ are beyond BAT for bigger liquid fired combustion engines, e.g. DPF is not state of the art for this engine category. In order to have a “Stand der Technik” or BAT-approach following is needed:

- **The current TA-LUFT 2002 particulate limit of 20 mg/Nm³ (5 % O₂) = 7.5 mg/Nm³ (15 % O₂) is *already* representing the latest BAT for bigger liquid fired engine units, this limit is in compliance with the current approved EU LCP BREF 2017 /6/. By retaining the current TA-LUFT 2002 particulate limit for bigger liquid fired combustion engines the “Stand der Technik” fundamental requirement expressed in TA-LUFT 2002 paragraph 5.1.1. is fulfilled ! Additionally then in the supporting material document /7/ paragraph 1 (“ A. Allgemeiner Teil”) : text stated “*Die Anforderungen sollen in einer einzigen Verordnung zusammengefasst und an den fortgeschrittenen Stand der Technik angepasst werden.*“ **would then also be fulfilled.****
- **Insert as minimum the missing “sudden interruption in gas supply” derogation Article 6 (12) text of the EU MCPD 2015/2193. By this practical BAT practices can be fulfilled in these sudden emergency occasions (see also above item 2.4).**

3.4. Measurements

Article 30(6): According to this article an emission limit is fulfilled when all single measurement results are below the limit value. **A sentence is to be added as minimum such as “measurement uncertainties (determined according to VDI 4219 August 2009) to be excluded from the measured value before check to limit value” (see also VDMA December 2016 submission). In the MCPPD 2015/2193 Annex III is stated “...In the case of periodic measurements, the emission limit values referred to in Article .. shall be regarded as having been complied with if the results of each of the series of measurements or of the other procedures defined and determined in accordance with the rules laid down by the competent authority, do not exceed the relevant emission limit value. .. “, i.e. an average of the measured samples is proposed.**

Sources

/1/ "Referentenentwurf des Bundesministeriums für Umwelt, Naturschutz und nukleare Sicherheit. Verordnung zur Einführung der Verordnung über mittelgroße Feuerungsanlage sowie Änderung der Verordnung über kleine und mittlere Feuerungsanlagen"; issued by German Environmental Ministry 30.04.2018.

/2/ "Entwurf zur Anpassung der Ersten Allgemeinen Verwaltungsvorschrift zum Bundes-Immissionsschutzgesetz (Technische Anleitung zur Reinhaltung der Luft – TA Luft)"; September 9th 2016 at https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Luft/taluft_entwurf_bf.pdf

/3/ "O2 Reference Point in Exhaust Emission Regulation The Euromot Position", 2015 at link https://www.euromot.eu/wp-content/uploads/2018/02/EUROMOT_Position-O2_Refpoint_2002-10-15.pdf

/4/ IED 2020/75/EU at <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0075&from=EN>

/5/ UNECE "1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to the Convention on Long-range Transboundary Air Pollution, as amended on 4 May 2012", dated 6th May 2013 at link http://www.unece.org/fileadmin/DAM/env/documents/2013/air/eb/ECE.EB.AIR.114_ENG.pdf

/6/ LCP BREF 2017 at http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP/JRC107769_LCP_bref2017.pdf

/7/ "Begründung: Verordnung zur Einführung einer Verordnung über mittelgroße Feuerungsanlagen sowie zur Änderung der Verordnung über kleine und mittlere Feuerungsanlagen"; issued by German Environmental Ministry 30.04.2018.

/8A/ https://www.gesetze-im-internet.de/bimschv_1_2010/_1.html

/8B/ https://www.gesetze-im-internet.de/bimschv_1_2010/BJNR003800010.html

/9/ UNECE Gothenburgh Protocol "Guidance document on control techniques for emissions of sulphur, NOx, VOC, and particulate matter (including PM10, PM2.5, and black carbon) from stationary sources, January 2015 at link http://www.unece.org/fileadmin/DAM/env/documents/2012/EB/ECE.EB.AIR.117_AV.pdf

/10/ "330
Besluit van 19 augustus 2017 tot wijziging van het Activiteitenbesluit milieubeheer ten behoeve van de implementatie van Richtlijn (EU) 2015/2193 inzake de beperking van de emissies van bepaalde verontreinigende stoffen in de lucht door middelgrote stookinstallaties (Pb EU 2015, L 313) " at link <https://zoek.officielebekendmakingen.nl/stb-2017-330.html>

/11/ <https://www.theguardian.com/world/2017/dec/12/italy-declares-state-emergency-gas-explosion-austria>

Annex I Particulate Measurement Discussion 1 / 2

Particulate Emission Measurement

- LCP BREF 2017 chapter 10 BAT 4 for dust monitoring:
 - EN 13284-1:
 - " Stationary source emissions – Determination of low range mass concentration of dust – Part 1: Manual gravimetric method "
 - and EN 13284-2:
 - E.g. " BS EN 13284-2" defines the requirements for carrying out the calibration of continuous particulate monitors used on installations falling under the Large Combustion Plant and Waste Incineration Directives. "

EN-13284-1 validation method, uncertainty I:

Table A.1 Results of validation test

	Plant		
	A		B
Number of teams in parallel	4		3
Number of out-stack/in-stack devices	1/3		3/0
Number of successive tests	32		16
	Dust on filter only mg/m ³	Total dust including rinsing mg/m ³	Total dust mg/m ³
Dust concentration mean:	4,7	6,4	2,5
range covered:	2 to 17	3 to 19	0,3 to 6,8
Repeatability	1,7	2,1	1,9
Expanded uncertainty	2,4	4,0	1,8
Reproducibility	3,4	5,7	2,6

The detection limit was estimated from results by one team, to be:

- for dry gases: approximately 0,3 mg/m³ (dust on filter only);
- for water saturated gases: approximately 2 mg/m³ (total dust).

A.3 Comments

During the above tests, some high field blank values were reported (± 1 mg/m³ or higher) due to weighing uncertainties of rinses dry extracts (e.g. use of vessels of improper material).

Further investigation showed that these uncertainties can be reduced to less than 0,5 mg/m³, leading to an improvement of repeatability and reproducibility.

Increased sampling time to 60 min or to 90 min would improve significantly the reproducibility of measurements.

A.2 Experimental data

Validation tests were performed in two municipal waste incinerators equipped with different kinds of gas treatment:

- Plant A: semi dry process with a fabric filter, stack gas temperature: 140 °C;
- Plant B: electrostatic precipitator, with a scrubber, stack gas temperature: 60 °C, water saturated.

Sampling duration was limited to 30 min.

The results are given in [Table A.1](#).

Annex I Particulate Measurement Discussion 2 / 2

Uncertainty Discussion II

The particulate measurement standard EN 13284-1 has been validated with special emphasis around 5 mg/m^3 on an average half hour sampling time (chapter "1 Scope"). Standard does not give the minimum detection limit, but In Chapter A.3 it is stated that **uncertainties can be down (best case) to 0.5 mg/m^3** . Own discussions with a measurement consultant: detection limit in field test is in practice is $1 \dots 2 \text{ mg/m}^3$. According to VTT (Technical Research Centre of Finland) uncertainty (based on experience) of the method is $\pm 2 \text{ mg/m}^3$.

EN 13284-1 document "SFS-EN 13284-1:2017" i.e. mg/m^3 is given at actual O_2 . In case without heat recovery the engine flue gas temperature can typically be up to around 350 C (dependent on engine type) and oxygen content of a diesel engine around $\sim 13 \text{ vol-\%}$, thus a ("best case" ..practical) uncertainty (see next pages) of $0.5 \dots 2 \text{ mg/m}^3$ at actual oxygen content corresponds then to approximately $0.38 \dots 1.5 \text{ mg/m}^3 @ 15 \text{ \% O}_2$. For further information about reference O_2 for a reciprocating engine, please see https://www.euromot.eu/wp-content/uploads/2018/02/EUROMOT_Position-O2_Refpoint_2002-10-15.pdf

Uncertainty Discussion III

"Chapter 5.3.2.3 Auswahl von Messverfahren (September 2016 TA LUFT draft):
" Messungen zur Feststellung der Emissionen sollen unter Einsatz von Messverfahren und Messeinrichtungen durchgeführt werden, die dem Stand der Messtechnik entsprechen. Die Nachweisgrenze des Messverfahrens **sollte kleiner als ein Zehntel der zu überwachenden Emissionsbegrenzung sein** "

"Die Nachweisgrenze des Messverfahrens **sollte kleiner als ein Zehntel der überwachenden Emissionsbegrenzung sein**" should require (diesel oil case TA LUFT September 2016 proposed limit $1 \text{ mg/m}^3 (5 \text{ \% O}_2)$) that the dust method to measure a small dust emissions such as $1/10 = 0.1 \text{ mg/m}^3 (5 \text{ \% O}_2) = 0.038 \text{ mg/m}^3 (15 \text{ \% O}_2)$ which is $\ll 0.38 \dots 1.5 \text{ mg/m}^3 (15 \text{ \% O}_2)$ lowest .. "practice" uncertainty of the EN method.

Set dust limit for diesel oil operation $1 \text{ mg/(N)m}^3 (5 \text{ \% O}_2)$ cannot be measured in a reliable way .. ! To be raised $(0.38 \dots 1.5)/0.038 = 10 \dots 39$ times for reliable measurements !

→ **Current TA LUFT dust limit of $20 \text{ mg/Nm}^3 (5 \text{ \% O}_2)$ to at least to be maintained.**

Annex II Inorganic and mutagenic material limit discussion

- Other liquid fuels:

- Particulate limit proposed 10 mg/Nm³ (5 % O₂) = 3.8 mg/Nm³ (15 % O₂) for plants > 20 MWth.
- Chapters 5.2.2 (inorganic material) and 5.2.7.1.1 (mutagenic material) strict limits also to be fulfilled according to TA LUFT Draft September 2016. Discussion:

The measurement of the large number of substances mentioned under chapters 5.2.2 / 5.2.7.1.1 at the given limit values is complex and cannot be reliably carried out at the low concentrations. The emission of these pollutants depends heavily on the composition of the fuel used. Instead following could be required: The operator provides proof (e.g. of a control of the fuels used or technically sensible reduction measures) that the emission levels for the substances vanadium, nickel and chromium (as listed in points 5.2.2 and 5.2.7.1.1); LCP BREF 2017 asks for fuel testing of Ni and V (BAT 9 table, chapter 10) are not exceeded could be the only requirements in order to fulfil these points/chapters. NOTE ! E.g. in BImSchV 13 Abschnitt 2, part 6 for big liquid fired boilers only the V metal concentration is regulated besides the total particulate mass. I.e. for equal treatment between different techniques only fulfilment of the V metal concentration limit should be asked for.

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ISUZU MOTORS GERMANY	VOLVO CONSTRUCTION EQUIPMENT
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