Sustainable Leather Foundation
Standard for Air Pollution

Reference: FSE10.1
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AIR POLLUTION STANDARD AND BENCHMARK

Summary: The SLF air output quality standard provides the context, audit of air quality, and provides the facility under audit the methodology to analyse and report their air quality to an interested party ensuring the reporting of air output quality, and such that the environmental impact and comparisons of the facilities' use can be compared to global levels and to other facilities of similar size and type.

1. Scope

The World Health Organisation (WHO) 2005 Air Quality Guideline (AQG) Update and the 2016 consultation helps to set benchmarks for the basic air pollutants: particulates, sulfur dioxides, nitrogen oxides, carbon monoxide, selected pollutants, and ozone – some of these have been incorporated as benchmarks in this Standard. This Standard does not include within its Scope, environmental tobacco smoke, electronic cigarette emissions, airborne diseases, man-made fibres, solid waste associated air emissions, and radioactive (natural or other) emissions. A constant screening of International chemical regulations, global harmonisation system (GHS), and EU chemical labelling and packaging (CLP) restrictions have also informed the benchmarks used in this Standard.

The method and definition of air output quality for facilities (and their waste treatment plants) in the leather value chain is included in this Standard, this can include both health and safety emissions and production considerations . The facilities in the value chain include all facilities from the farm to the end-of-life of the leather.

The Standard on air output quality includes all outputs of substances by means of travel by air out of the facilities (including their sub-contractors, and waste handling/treatment vendors) into the surrounding environment. The air output quality in question is only related to the Scope of the SLF audit (or mapped certification) that is being audited. The Scope of the Air Emissions Standard does not include indirect air quality emissions that are related to the preparation of inputs - that are then used on the site (included within the Scope of the audit).

2. Normative references

The following referenced documents are useful in the understanding of this document and are provided for further guidance. In the case of dispute these references form the core of the evidence in support of the Standard and Benchmarks used here:

WHO, 2005. WHO air quality guidelines for particulate matter, ozone, nitrogen dioxide, and sulfur dioxide. Global update 2005 – summary of risk assessment. World Health Organisation, Geneva Switzerland. WHO/SDE/PHE/OEH06.02.

ECHA, 2021. *REACH, CLP, AND BPR legislation*, viewed 24 March 2021, <https:// https://echa.europa.eu/legislation>

WHO, 2016. WHO expert consultation: available evidence for the future update of the WHO global air quality guidelines (AQGs), Bonn, Germany 29 Sep – 1 Oct 2015. World Health Organisation (WHO), Regional Office for Europe, Marmorvej, Copenhagen, Denmark.

3. Terms and definitions

AQG – Air quality guideline.

PM_1, $PM_{2.5}$, and PM_{10} – Particulate matter (PM) that can be solid or liquid particles. The subscript refers to the size of the particle namely 1, 2.5, 10 microns (µm). The range of particulate matter given have globally acknowledged health effects.

Sulfide - S^{2-}, a sulfur anion that when combined with two hydrogen ions will produce hydrogen sulfide, a toxic and highly odorous (at certain concentrations) compound that is implicated in the nuisance of poorly managed facilities.

Ammonia – a mucus lining irritating gas (NH_3) that when air borne can create chronic problems through long-term exposure or that can react with other fine particles to create ammonium salts that also create respiratory difficulties.

Chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) - are chlorine- and fluorine-containing organic compounds that are generally regarded as substances that deplete the ozone. These compounds are not the same as simple fluorocarbons.

CO_2/CO – carbon dioxide (CO_2) and carbon monoxide (CO) are oxides of carbon. CO_2 has a greenhouse gas warming potential and is thus implicated in the greenhouse gas effect. CO_2/CO are created through the aerobic combustion of carbon-containing materials. CO is considered toxic, especially in confined spaces.

H_2S – hydrogen sulfide, a highly toxic gas that is heavier than air, is difficult to detect without a gas detector, or test badge/strip.

NOx – the oxides of nitrogen, e.g., nitrous oxide (N_2O), nitric oxide (NO), and nitrogen dioxide (NO_2) often referred to as smog which emanate from the burning of hydrocarbons.

Odour – any unpleasant smell that easily causes offence. Odour nuisance is a negative association that the wider community has for one, or many, suspected facilities. Odour mitigations and audits can go part of the way to exonerate a facility, but Standards related to odour assessment look at ongoing management strategies.

SOx – the oxides of sulfur, e.g., sulfur monoxide (SO), sulfur dioxide (SO_2), sulfur trioxide (SO_3), disulfur monoxide (S_2O), sulfite (SO_3), sulfate (SO_4), disulfur dioxide (S_2O_2), cyclic oxides (S_XO), and cyclic dioxides (S_XO_2). SOx are often associated with the burning of sulfur containing fuels.

STEL – short term exposure limit.

VOC – volatile organic compounds, particularly human-created VOCs are of health concern to communities and individuals who breath them in. VOCs are largely emitted from fuels, solvents, and through combustion of biomass.

4. Principle

The chemistry tested for, must be linked to an air quality risk assessment or a manufacturer restricted substance list (MRSL) that identifies that there is (or is not) a need for air pollution measurement.

Facility

The facility air outputs are monitored, and the levels obtained will result in the output being classified as A, B, C, or D. The principle of air quality assessment is to measure the air pollutants that are present in the facility (by mostly fixed-point measurement, e.g., emission stacks or designated danger area) and to provide the facility with data that helps minimise the contribution that the facility makes to those levels. The due diligence of the facility being audited is to do estimates (through calculations) and confirm them with measurements

that show that that the facility is not responsible for the pollutant levels measured. It is the requirement of this standard that the facility shows continuous improvement in the air quality of the facility and that a strategy is in place to improve low performance in pollutants appearing in lower bands.

The facility air quality benchmark levels laid out in this Standard appear in four bands A, B, C, and D. The B-Banding correspond (in part) onto the WHO Air Quality levels (Annex 4 - WHO, 2016) and includes an additional 3 SLF bands, see Table 1.

A-Banding is a level considered above the WHO AQG to demonstrate outstanding effort (possibly non-detectable levels). A-Banding is automatically awarded to facilities that do not have any processes that generate the pollutants listed or whose MRSL and risk assessments can show that the air pollutant listed is not directly produced by the facility.

C-Banding shows a level below the WHO level which indicates, transparently, that the facility is below the WHO AQG level and that work is underway to improve this. If a stricter level than those given in C-Banding is required by law (then the regulatory limit will supersede the C-Banding limit).

D-Banding shows that the air output has not been measured at the time of the audit or is exempt from monitoring. The low short term exposure limit (STEL) substances that appear in Table 1 are substances that are of such high priority that they must meet bands A, B, and C – they cannot have levels listed in D-Banding. Failure to measure lethal levels of toxic gases, e.g., hydrogen sulfide, H_2S, within the period of the audit will constitute non-conformance to this Standard.

The frequency of measuring air pollutants is an important decision, with the optimum laying somewhere between too frequent and not frequent enough. There is a distinction between low STEL (L-STEL) and higher STEL (H-STEL) substance testing.

Mitigation to remove air emissions before they can enter the environment and continuous improvement of the air emissions from the facility is considered best practice and the decision-making and monitoring of the facility must demonstrate this practice.

Boilers/Incineration

The air outputs from the boilers and incinerators must be monitored, and the levels obtained will result in the output being classified as A, B, C, or D. The principle of air quality assessment in boilers is to measure the air pollutants that are present in the chimneys/stacks from boilers or incinerators (by mostly fixed-point measurement) and to provide the facility with data that helps minimise the contribution that the boiler/incinerator makes to those levels. It is the requirement of this standard that the facility shows continuous improvement in the boiler/incinerator air quality of the facility and that a strategy is in place to improve low performance in pollutants appearing in lower bands.

The boiler/incinerator air quality benchmark levels laid out in this Standard (Table 1) appear in four bands A, B, C, and D - the same as those given for facility emissions. If a stricter level than those given in the C-banding is required by law (then the regulatory limit will replace the C-Banding limit).

5. Procedure and benchmark

5.1 The facility will have a site plan that identifies fixed points (marked on the site map) where the air quality of boilers/incinerators and exhaust ducting from surface coating machinery (or extraction hoods) are identified.

5.2 The facility must give a full justification to an auditor why a fixed point (exhaust) of an obvious air emission source is exempted from the scope of audit. That is, unused exhaust ducting should be removed, or be included within the scope of the audit.

5.3 Air pollutants associated with the facility or boiler/incinerator must be identified from Table 1 using the MRSL, the Air Emissions Risk Assessment, and from a walk around site - and will marked be marked off on the report sheet, see Annex A. Exclusion should be fully explained.

Table 1. Air emission benchmarks for facilities.

CAS #	Substance	Limit			
		A	B	C	D
Low short term exposure limit (STEL) gases					
7783-06-4	Hydrogen sulfide	10 ppm	20 ppm	90 ppm* 2 ppm/hr by badge	NM = Failure
7664-41-7	Ammonia	10 ppm	25 ppm	300 ppm*	NM = failure
10049-04-4	Chlorine dioxide	0.1 ppm	0.3 ppm	5 ppm*	NM = failure
75-09-2	Dichloromethane	25 ppm	125 ppm	2300 ppm*	NM = failure
Higher short term exposure limit (STEL) gases/particles					
-	PM_{10}	20 mg/Nm^3	50 mg/Nm^3	500 mg/Nm^3	NM
-	$PM_{2.5}$	10 mg/Nm^3	25 mg/Nm^3	250 mg/Nm^3	NM
-	NOx	40 mg/Nm^3	150 mg/Nm^3	450 mg/Nm^3	NM
-	SOx	100 mg/Nm^3	300 mg/Nm^3	400 mg/Nm^3	NM
-	Total Volatile Organic Compounds (by meter)	0.3 mg/Nm^3	0.5 mg/Nm^3	10 mg/Nm^3	NM
71-42-2	Benzene	100 ppb	0.5 ppm	2 ppm	NM
111-96-6	Bis(2-methoxyethylether)	1 ppm	5 ppm	10 ppm	NM
108-39-4	m-cresol	10 mg/Nm^3	20 mg/Nm^3	50 mg/Nm^3	NM
95-48-7	o-cresol	10 mg/Nm^3	20 mg/Nm^3	50 mg/Nm^3	NM
106-44-5	p-cresol	10 mg/Nm^3	20 mg/Nm^3	50 mg/Nm^3	NM
95-50-1	1,2-dichlorobenzene (1,2-DCB)	10 ppm	20 ppm	50 ppm	NM
107-06-2	1,2-dichloroethane	2 ppm	10 ppm	30 ppm	NM
110-80-5	2-ethoxyethanol	0.5 ppm	2 ppm	5 ppm	NM
111-80-5	2-ethoxyethyl acetate	0.5 ppm	2 ppm	5 ppm	NM
110-71-4	Ethylene glycol dimethyl ether	1 ppm	5 ppm	10 ppm	NM
109-86-4	2-methoxyethanol	10 ppb	0.1 ppm	2 ppm	NM
110-49-6	2-methoxyethylacetate	10 ppb	0.1 ppm	2 ppm	NM
75-09-2	Methylene chloride	20 ppm	50 ppm	100 ppm	NM
-	Polychlorinated dibenzodioxins (PCDD)	0.05 pg/m^3	0.1 pg/m^3	0.4 pg/m^3	NM
-	Polychlorinated dibenzofurans (PCDF)	0.05 pg/m^3	0.1 pg/m^3	0.4 pg/m^3	NM
79-01-6	Trichloroethylene	1 ppm	10 ppm	30 ppm	NM
112-49-2	Triethylene glycol dimethyl ether	1 ppm	5 ppm	10 ppm	NM
127-18-4	Tetrachloroethylene	10 ppm	20 ppm	50 ppm	NM
1330-20-7	Xylene	20 ppm	50 ppm	100 ppm	NM

* Levels equal to or higher; NM = not measured yet

5.4 The number of times the air pollutants are measured (for both L-STEL and H-STEL substances) must be decided (recorded in a decision log) and reviewed (yearly).
5.5 Continuous monitoring, reported in 8-hour windows, for L-STEL substances are considered often enough.
5.6 For L-STEL substances a viable, freshly opened indicator badge that when worn (for a window suggested by the manufacturers) should show levels indicating that the banding is C-banding or higher. Instrumental or badge substance detection that show substance levels that constitute a C-Banding (or higher) level will be deemed acceptable for this Standard. A facility should always aim to do better.
5.7 For L-STEL substances, daily records using Annex A should be kept and any incidents should be discussed in the continuous review of the air emissions. Annex B showing continuous conformance with C-banding (or higher) should be presented in audit.
5.8 For low STEL substances, incidents that show where C-banding levels were exceeded should always be fully explained in a report. The Standard expects the incidents are minimised, that the root cause can be explained, and that plans have been altered to prevent re-occurrence.
5.9 H-STEL substances must be monitored at least yearly, and the auditor will need a thorough explanation why the facility frequency of measurement was decided.
5.10 The facility will monitor (at the frequency decided in Clause 5.4, 5.5 and 5.6), at the predetermined fixed points, all the air outputs of the facility, boiler, and incinerator - these will be recorded on Annex A.
5.11 The levels for each output are diagnosed according to the scheme outlined below (and Table 1).
5.12 The banding should be recorded on the SLF Standard Air Emission Annual Report (given in Annex B)
5.13 The facility will monitor and track (including visibly) the annual performance of the air emission mitigation system (by facility fixed point after filters), the boilers (by individual unit after filters), and of the incinerators (by individual unit after filters).
5.14 A maintenance plan for ensuring optimal performance of the emission filters should be present and should show evidence that they are working.
5.15 The continuous improvement of all air emissions will be monitored by annual review and necessary improvements planned for.
5.16 National limits for air emissions must be shown to the auditor to demonstrate that the facility has knowledge of local and national/regional statutory requirements.

6. Calculation of air emission

6.1 H-STEL and L-STEL substances that are produced by the facility that are marked off as laid out in Clause 5.3 must be rated using Table 1.
6.2 The levels of L-STEL substances are recorded daily using Annex A and the levels transferred to Annex B to show yearly performance.
6.3 The levels of H-STEL substances are monitored at a frequency decided by management using Annex A and the levels transferred to Annex B to show yearly performance.
6.4 The levels of all substances must be compared to national statutory obligations.

7. Diagnostic parameters

7.1 L-STEL substances are considered high priority by the SLF and failure to monitor them, in the manner specified by the Principle/Procedure and Benchmark (outlined above), will not meet the expectations of this Standard as they pose a short-term exposure level threat.
7.2 H-STEL substances are considered lower priority by the SLF, and a facility is required to monitor some (or all of them) in the manner specified by the Principle/Procedure (outlined above) and the facility will then have their banding (and measured annual average) published.
7.3 If any H-STEL substances, that are produced by the facility, have been excluded from Annex A their exclusion must be fully justified.
7.4 If the air quality levels differ from the nationally statutory levels, this should be brought to the auditor's attention. Non-compliance to statutory requirements will immediately result in the facilities' Dashboard entry going red (non-compliance).

8. Report

The annual Test Report for Air Emission is the latest digital or printed report that shows the air emission calculated (see Clause 6). The report, Annex B, should include:

1. A reference to this Sustainable Leather Foundation Standard (i.e., FSE10.1: 2021)
2. Compounds identified from Table 1, which were identified as relevant for the facility will be marked off on Annex A with justification for any exclusions being recorded in a decision log.
3. The levels of each emission that has been recorded (using Annex A) and averaged for the whole of the year.
4. The Air Emissions and how they compare to the SLF benchmark should appear on the webpage dashboard and the digital device application content.
5. Non-compliance to national statutory obligations must be recorded and flagged.

Annex A

Facility name: **Date:**

Relevant? (Tick if Y)	CAS No.	Chemical name	Location ID and measured levels	Incident (Y/N)?
Effluent plant emission				
☐	7783-06-4	Hydrogen sulfide		
Production emission				
☐	7783-06-4	Hydrogen sulfide		
☐	7664-41-7	Ammonia		
☐	10049-04-4	Chlorine dioxide		
☐	75-09-2	Dichloromethane		
Boiler/incinerator emission				
☐	-	PM_{10}		
☐	-	NOx		
☐	-	SOx		
☐	-	Polychlorinated dibenzodioxins (PCDD)		
☐	-	Polychlorinated dibenzofurans (PCDF)		
Finishing/VOC emission				
☐	-	TVOC		
☐	71-42-2	Benzene		
☐	111-96-6	Bis(2-methoxyethylether)		
☐	108-39-4	m-cresol		
☐	95-48-7	o-cresol		
☐	106-44-5	p-cresol		
☐	95-50-1	1,2-dichlorobenzene (1,2-DCB)		
☐	107-06-2	1,2-dichloroethane		
☐	110-80-5	2-ethoxyethanol		
☐	111-80-5	2-ethoxyethyl acetate		
☐	110-71-4	Ethylene glycol dimethyl ether		
☐	109-86-4	2-methoxyethanol		
☐	110-49-6	2-methoxyethylacetate		
☐	75-09-2	Methylene chloride		
☐	-	Polychlorinated dibenzodioxins (PCDD)		
☐	-	Polychlorinated dibenzofurans (PCDF)		
☐	79-01-6	Trichloroethylene		
☐	112-49-2	Triethylene glycol dimethyl ether		
☐	127-18-4	Tetrachloroethylene		
☐	1330-20-7	Xylene		

Annex B – Sustainable Leather Foundation Air Emission Annual Report (FS10.1)

Facility name: **Date:**

Relevant? (Tick if Y)	CAS No.	Chemical name	Annual level (Banding)	Number of incidents
Effluent plant emission				
☐	7783-06-4	Hydrogen sulfide		
Production emission				
☐	7783-06-4	Hydrogen sulfide		
☐	7664-41-7	Ammonia		
☐	10049-04-4	Chlorine dioxide		
☐	75-09-2	Dichloromethane		
Boiler/incinerator emission				
☐	-	PM_{10}		
☐	-	NOx		
☐	-	SOx		
☐	-	Polychlorinated dibenzodioxins (PCDD)		
☐	-	Polychlorinated dibenzofurans (PCDF)		
Finishing/VOC emission				
☐	-	TVOC		
☐	71-42-2	Benzene		
☐	111-96-6	Bis(2-methoxyethylether)		
☐	108-39-4	m-cresol		
☐	95-48-7	o-cresol		
☐	106-44-5	p-cresol		
☐	95-50-1	1,2-dichlorobenzene (1,2-DCB)		
☐	107-06-2	1,2-dichloroethane		
☐	110-80-5	2-ethoxyethanol		
☐	111-80-5	2-ethoxyethyl acetate		
☐	110-71-4	Ethylene glycol dimethyl ether		
☐	109-86-4	2-methoxyethanol		
☐	110-49-6	2-methoxyethylacetate		
☐	75-09-2	Methylene chloride		
☐	-	Polychlorinated dibenzodioxins (PCDD)		
☐	-	Polychlorinated dibenzofurans (PCDF)		
☐	79-01-6	Trichloroethylene		
☐	112-49-2	Triethylene glycol dimethyl ether		
☐	127-18-4	Tetrachloroethylene		
☐	1330-20-7	Xylene		

Was a site plan of the facility with features defined in Clause 5.1 seen?	☐ **YES**	☐ **NO**
Were the exclusions of fixed points in Clause 5.2 justified?	☐ **YES**	☐ **NO**
Were the exclusions of substances in Annex A justified?	☐ **YES**	☐ **NO**
Was a decision log (or similar) seen that justifies frequency of all air emission substances?	☐ **YES**	☐ **NO**
Was the L-STEL frequency adequate?	☐ **YES**	☐ **NO**
Were L-STEL incidents fully explained through reports?	☐ **YES**	☐ **NO**
Were there any signs visually that suggest air emissions did not support the measured values?	☐ **YES**	☐ **NO**
Was there a maintenance plan for devices that mitigate air emissions?	☐ **YES**	☐ **NO**
Was there evidence these devices were working?	☐ **YES**	☐ **NO**
Was there any indication that continuous improvement of air quality was taking place in the facility?	☐ **YES**	☐ **NO**
Can the SLF element be earned or not?	☐ **YES**	☐ **NO**
Has any mitigation technology been incorporated since the last audit?	☐ **YES**	☐ **NO**
Is the mitigation technology approved and monitored?	☐ **YES**	☐ **NO**

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