This document provides only an annex from the IRMA Standard v2.0 DRAFT 2.

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CHAPTER ANNEXES

ANNEX 4.5-A: IRMA Ambient Air Quality Criteria

Pollutant	Limit concentration values[i]	Averaging period	Permitted exceedances / year
Sulphur dioxide (SO_2)	350 µg/m^3	1 hour	3
	50 µg/m^3	24 hours	18
	20 µg/m^3	1 year	not applicable
Nitrogen dioxide (NO_2)	200 µg/m^3	1 hour	3
	50 µg/m^3	24 hours	18
	20 µg/m^3	1 year	not applicable
Fine particles (PM-2.5)	10 µg/m^3	1 year	not applicable
	25 µg/m^3	24 hours	18
PM-10	45 µg/m^3	24 hours	18
	20 µg/m^3	1 year	not applicable
Lead (Pb)	0.5 µg/m^3	1 year	not applicable
Carbon monoxide (CO)	10 mg/m^3 [ii]	Maximum daily 8-hour mean	not applicable
	4 mg/m^3	24 hours	18
Benzene	3.4 µg/m^3	1 year	not applicable
Ozone	120 µg/m^3	Maximum daily 8-hour mean	25 days averaged over 3 years
Arsenic (As)	6.0 ng/m^3	1 year	not applicable
Cadmium (Cd)	5.0 ng/m^3	1 year	not applicable
Nickel (Ni)	20 ng/m^3	1 year	not applicable
Polycyclic Aromatic Hydrocarbons	1.0 ng/m^3 (as concentration of Benzo(a)pyrene)	1 year	not applicable
Mercury (Hg) from production and processing of Zn, Ni, Cd	New sources: 0.2 mg/m3 Existing sources: 1.0 mg/m3	not applicable	not applicable
Mercury (Hg) from the recovery of metal from any form of scrap material by the application of heat	New sources: 0.05 mg/m3 Existing sources: 0.05 mg/m3	not applicable	not applicable

Sources: EU. Air Quality Standards (as of July 3, 2013). https://environment.ec.europa.eu/topics/air/air-quality/eu-air-quality-standards_en; and EU Air Quality Standards Table 1 – Limit values for the protection of human health to be attained by 1 January 2030. https://www.europarl.europa.eu/doceo/document/TA-9-2024-0319_EN.html; except for Mercury: South Africa, 2004 THE NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT (ACT NO. 39 OF 2004), STANDARDS AND REGULATIONS https://saaqis.environment.gov.za/Pagesfiles/NEM-AQA%20Booklet_10-09-2015.pdf

[i] Arsenic, cadmium, lead, nickel, and benzo(a)pyrene mean the total content of these elements and compounds in the PM10 fraction; sampling points measuring arsenic, cadmium, lead, mercury, nickel and polycyclic aromatic hydrocarbons shall, where possible, be co-located with sampling points for PM10

[ii] The maximum daily 8-hour mean concentration shall be selected by examining 8-hour running averages, calculated from hourly data and updated each hour. Each 8-hour average so calculated shall be assigned to the day on which it ends, i.e. the first calculation period for any 1 day shall be the period from 17.00 on the previous day to 1.00 on that day; the last calculation period for any 1 day shall be the period from 16.00 to 24.00 on that day.

ANNEX 4.5-B: Recommended Air Quality Guidelines (AQG), World Health Organization (for information only)

Pollutant	Averaging time	Interim target 1	Interim target 2	Interim target 4	Interim target 4	AQG level
PM2.5 (µg/m^3)	Annual	35	25	15	10	5
	24-hour	75	50	37.5	25	15
PM10 (µg/m^3)	Annual	70	50	30	20	15
	24-hour	150	100	75	50	45
O_3 (µg/m^3)	Peak season	100	70	--	--	60
	8-hour	160	120	--	--	100
NO_2 (µg/m^3)	Annual	40	30	20	--	10
	24-hour	120	50	--	--	25
SO_2 (µg/m^3)	24-hour	125	50	--	--	40
CO (mg/m^3)	24-hour	7	--	--	--	4

Source: World Health Organization. 2021. WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. Table 0.1. https://apps.who.int/iris/handle/10665/345329.

ANNEX 4.5-C: IRMA Dust Deposition Criteria

Measurement Method	Limit value
According to TA Luft Standard, which includes both soluble and insoluble matter[iii]	10mg/m^2/hour 350 mg/m^2/day 30g/m^2/thirty-days
According to WA 2021 Guideline, which only includes insoluble matter[iv]	4 g/m^2/thirty-days (maximum) 2 g/m^2/thirty-days (above baseline/background)

Sources: US EPA guidance; TA Luft Standard; AFNOR NF X43-007; Government of Western Australia; NSW EPA 2016; and NZ MfE 2016.

[iii] IRMA has added a dust deposition limit because dust is not listed on EU list of contaminants as it is not strictly harmful to health rather it is a "nuisance" and can be problematic for communities, livelihoods, values, and ecosystems located near project sites. IRMA is not aware of any legal criteria in place in a mining country. However, US EPA guidance suggests, "a soiling of 10mg/m2/hour is generally considered to pose a soiling nuisance". This equates to 240mg/m2/day of Total Depositional Dust. The EPA recommends a maximum level of 350mg/m2 day of dust deposition when measured according to TA Luft standard, which includes both soluble and insoluble matter (i.e. EPA compliance monitoring is based on the TA Luft Method). This requirement is based on the German Technical Instructions on Air Quality Control (TA Luft) Regulation, 2022, which is the reference IRMA has used already in the 2018 IRMA Standard V1.0. (TA Luft Regulation available at : https://www.bmuv.de/fileadmin/Daten_BMU/Download_PDF/Luft/taluft_engl.pdf).

The monthly limit value comes from the French national standardization body (AFNOR) that has defined 3 categories of dust pollution based on monthly deposition values: 1) Lightly polluted area: Dust < 10 g/m^2/month; 2) Moderately polluted area: 10 g/m^2/month < Dust < 30 g/m^2/month; AND 3) Heavily polluted area: Dust > 30 g/m^2/month (Norm AFNOR NF X43-007).

[iv] In its updated 2021 Guideline for Dust emissions, the Department of Water and Environmental Regulation of the Government of Western Australia provides these alternatives limit values. These are based on existing recommendations from NSW EPA (Australia) and NZ MfE (New Zealand) (source: https://www.wa.gov.au/system/files/2022-03/Draft%20Guideline%20-%20Dust%20emissions.pdf)

In its 2012 Ambient Air Quality Criteria (AAQCs), the Ontario Ministry of the Environment (MOE) also includes a limit value for 'dustfall', set at 7g/m^2/thirdy-days, which seems to include only insoluble matter. IRMA has kept the more protective (and more recent) value used by the Government of Western Australia (Source: https://www.airqualityontario.com/downloads/AmbientAirQualityCriteria.pdf)

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