



Interim Industrial Air Pollution and Ambient Air Quality Standards

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PREAMBLE

These NEOM Interim Industrial Air Pollution Standards have been developed with the objective of maintaining the highest standards of ambient air quality achievable in the geographic context of NEOM. These standards are based on an assessment of international and regional standards, including the standards of the International Financial Corporation (based on EU and US EPA), the Kingdom of Saudi Arabia (KSA), and GCC countries. In case of absence or inconsistency of specific acceptable best practice pollutant values IFC and EU standards must be followed at a minimum; the most stringent shall prevail.

CARBON POSITIVE

NEOM is aiming to be Carbon Neutral 2030 and Carbon Positive thereafter. In order to achieve this objective, NEOM is implementing regulatory controls to manage Greenhouse gas emissions across all industrial activities.

As such, NEOM shall make use after an eventual transition period of Renewable Energies only and it advocates the adoption of Circular Economy Principles. For any CO₂ emissions Carbon capture with subsequent storage or re-use is to become the norm. Proponents of industrial activities are required to investigate and report on the feasibility of applied pre-combustion and post-combustion carbon capture technology with respect to their industrial development proposals. NEOM encourages and will facilitate cross-industry partnering to re-purpose carbon emissions as a resource.

IMPLEMENTATION

Accompanying all applications, approvals and licensing of proposed and existing industrial activities, NEOM will require estimates of total volumes of pollutant emissions over time to enable quantification of total amount (volume x concentration) of individual pollutants over time.

On a case by case basis, NEOM may require more or less stringent standards due to ambient environmental conditions, and technical and economic considerations.

NEOM require the on-line monitoring of stacks and live telemetric transfer of air pollutant emissions data to NEOM. NEOM require supporting sampling and analysis events every quarter, or more in specific cases as deemed necessary.

The standards for combustion apply to reference conditions where combustion gases are dry, at a temperature of 273K, with pressure 101.3 kPa and with the oxygen content set to 15% v/v dry.

Industry	Source	Pollutant	Unit	Standard	Reference Standards
Semiconductors & Other Electronics Manufacturing (incl. some PV Manufacturing processes)	Surface Cleaning processes	VOC	mg/m ³	20	Reference: IFC
	Industry-specific hazardous air pollutants (HAPs) include: antimony compounds, arsenic compounds, arsine, carbon tetrachloride, catechol, chlorine, chromium compounds, ethyl acrylate, ethylbenzene, ethylene glycol, hydrochloric acid, hydrofluoric acid, lead compounds, methanol, methyl isobutyl ketone, methylene chloride, nickel compounds, perchloroethylene, phosphine, phosphorous, toluene, 1,1,1-trichloroethane, trichloroethylene (phased-out), xylenes. Current industry practice is not to use ethylbenzene, toluene, xylene, methylene chloride, carbon tetrachloride, chromium compounds, perchloroethylene, 1,1,1-trichloroethane, or trichloroethylene.	Organic HAP	Ppmv	20	
		Inorganic HAP	Ppmv	0.42	
	Manufacturing	Hydrogen Chloride (HCl)	mg/m ³	10	
		Hydrogen Fluoride (HF)	mg/m ³	5	
		Phosphine	mg/m ³	0.5	
		Arsine and As compounds	mg/m ³	0.5	
		Ammonia	mg/m ³	30	
		Acetone	mg/m ³	150	
Combustion Turbine	Natural Gas	NO _x	mg/m ³	100	IFC: 51
		SO ₂	mg/m ³	500	Qatar: 500
	Other Gaseous Fuels (eg. process gas) Plant >5MWth to <50MWth	PM ₁₀	mg/m ³	50	IFC: 50
		SO ₂	mg/m ³	400	IFC: 400
		NO _x	mg/m ³	150	IFC: 151
	Other Gaseous Fuels (eg. process gas) Plant >50MWth	PM ₁₀	mg/m ³	50	IFC: 50
		SO ₂	mg/m ³	500	EU: 400 to 2000
		NO _x	mg/m ³	150	IFC:151
Boiler	Natural Gas	NO _x	mg/m ³	200	IFC: 240
		SO ₂	mg/m ³	500	Qatar: 500
	Liquid Fuels Plant >5MWth to <50MWth	PM ₁₀	mg/m ³	50	IFC: 50
		SO ₂	mg/m ³	400	IFC: 400

	Liquid Fuels Plant >50MWth to <600MWth	NO _x	mg/m ³	200	IFC: 200
		PM ₁₀	mg/m ³	50	IFC: 50
		SO ₂	mg/m ³	400	IFC: 400
		NO _x	mg/m ³	200	IFC: 200
	Liquid Fuels Plant > 600MWth	PM ₁₀	mg/m ³	50	IFC: 50
		SO ₂	mg/m ³	200	IFC: 200
		NO _x	mg/m ³	200	IFC: 200
	Solid Fuels Plant >50MWth to <600MWth	PM ₁₀	mg/m ³	50	IFC: 50
		SO ₂	mg/m ³	400	IFC: 400
		NO _x	mg/m ³	200	IFC: 200
	Solid Fuels Plant > 600MWth	PM ₁₀	mg/m ³	50	IFC: 50
		SO ₂	mg/m ³	200	IFC: 500
		NO _x	mg/m ³	200	IFC: 400
All Combustion processes		Opacity	%	10	KSA: 10
		CO	mg/m ³	100	
Aggregate Works (Crusher Plant)		PM ₁₀	mg/m ³	500	Oman: 500
Aluminium	Calcination of Petroleum Coke	PM ₁₀	mg/m ³	30	Reference: IFC
		SO ₂	mg/m ³	400	
		NO _x	mg/m ³	411	
	Power Generation (Combustion)	NO _x	mg/m ³	100	
		SO ₂	mg/m ³	500	
		CO	mg/m ³	30	
	Reduction Cell	PM ₁₀	mg/m ³	20	
				Total emissions not to exceed 2kg/tAl	
		HF	mg/m ³	0.8	
		F	mg/m ³	1.5	
				Total emissions not to exceed 1kg/tAl	
		SO ₂	kg/tAl	26	
		VOC	mg/m ³	10	
		Opacity	%	10	
	Anode Manufacturing	PM ₁₀	mg/m ³	20	
		SO ₂	mg/m ³	500	
		NO _x	mg/m ³	300	

		F	kg/tAl	0.05	
		Opacity	%	20	
		VOC	mg/m³	10	
	Other Heaters and Furnaces	NO _x	mg/m³	50	
	CO	mg/m³	50		
Ammonia Fertilizer Industry		PM ₁₀	mg/m³	30	IFC: 50, Qatar: 50
		NO _x	mg/m³	250	IFC: 300, Oman: 150, Qatar: 125
		NH ₃	mg/m³	50	IFC: 50, Oman: 20, Qatar: 150
		VOC	% recovery	99	
		CO ₂	% (at 3% O ₂)	15	Oman: 5
Petrochemical and Ammonia Industry	General	CO	mg/m³	100	Reference: IFC and Local industry representatives
		SO ₂	mg/m³	500	
		NO _x	mg/m³	250	
		VOC	ppm	20	
		NH ₃	mg/m³	30	
		PM ₁₀	mg/m³	20	
		CO ₂	% (at 3% O ₂)	15	
Asbestos Removal and Handling		Asbestos Fibres		No <u>detectable</u> emissions to atmosphere	KSA: No emissions to atmosphere
Asphalt/Concrete	All emission points	PM ₁₀	mg/m³	50	Oman: 50
		Opacity	%	20	KSA: 20
Hazmat Incineration	Incinerator	PM ₁₀	mg/m³	34	KSA: 34, Oman: 50
		H ₂ S	ppm	5	Oman: 5
		SO ₂	mg/m³	50	KSA: 50
		NO _x	mg/m³	200	Oman: 200
		HCl	mg/m³	10	KSA: 10, Oman: 50
		HF	mg/m³	1	KSA: 1, Oman: 10
		CO	mg/m³	50	KSA: 50
		Dioxin	ng/m³	0.1	KSA: 0.1, Oman: 0.5
		Metals	mg/m³	0.5	KSA: 0.5

Ceramic		PM ₁₀	mg/m ³	50	IFC: 50
		NO _x	mg/m ³	600	IFC: 600
		SO ₂	mg/m ³	400	IFC: 400
		Lead	mg/m ³	0.5	IFC: 0.5
		HF	mg/m ³	5	IFC: 5
		HCl	mg/m ³	50	IFC: 30
Chlorine Manufacture		Cl	mg/m ³	30	KSA: 30
Desalination Plants		Cl	mg/m ³	50	Oman: 50
Petroleum Refining including Flaring	General	H ₂ S (fuel gas)	mg/m ³	150	
		PM ₁₀	mg/m ³	50	
		CO	mg/m ³	100	
		VOC	% recovery	95-100	
	Sulphur Recovery Units	SO ₂	mg/m ³	150	IFC: 150
	Other Combustion Units	SO ₂	mg/m ³	-	Propose deletion of this parameter as already covered under Combustion.
	Fluid Catalytic Cracking Unit	CO	ppm	500	Qatar: 100
		PM ₁₀	mg/m ³	100	Oman: 100, 1kg/t coke burn off
		Opacity	%	30	KSA: 30
	Flaring	CO	mg/m ³	50	Oman: 50
		SO ₂	mg/m ³	500	Oman (Sweet Natural Gas): 35
		NO _x	mg/m ³	150	Oman: 150
		CO ₂	mg/m ³	5000	Oman: 5000
		UHC	mg/m ³	10	Oman: 10
		PM ₁₀	mg/m ³	100	Oman: 100
	Other Heaters and Furnaces	NO _x	mg/m ³	50	
		SO ₂	mg/m ³	500	
		NO _x	mg/m ³	120	IFC: 120

Non-ferrous metal smelting / processes	Extraction or recovery, mining, refining, melting of metals, smelting of Pb, Zn, Cu, Cr, Cd and other metals.	SO ₂	mg/m ³	400	IFC: 400
		Phosphorus & compounds as P	mg/m ³	10	
		PM ₁₀	mg/m ³	50	IFC: 50
		Cu and compounds	mg/m ³	5	IFC: 20
		Cr	mg/m ³	2	IFC: 5
		Pb	mg/m ³	2	IFC: 2
		HCl	mg/m ³	50	
		Total fluorides	mg/m ³	5	IFC: 5
		Cl ₂	mg/m ³	5	IFC: 5
		Cd	mg/m ³	1	IFC: 2
		H ₂ S	ppm	5	IFC: 5
Iron Industry	Sintering	SO ₂	mg/m ³	500	IFC: 500
		NO _x	mg/m ³	750	IFC: 750
	Pelletizing	SO ₂	mg/m ³	500	
		NO _x	mg/m ³	250	
	All processes including furnaces	Total fluorides	mg/m ³	5	IFC: 5
		PM ₁₀	mg/m ³	20	IFC: 20
		Pb	mg/m ³	1	IFC: 2
		Cr	mg/m ³	2	IFC: 4
		Ni	mg/m ³	1	IFC: 2
Electric Arc Furnaces	PM ₁₀	mg/m ³	10	KSA: 12	
Glass Fibre		PM ₁₀	kg/T	5.5	KSA: 5.5, Qatar: 5.5
Grain Elevators		PM ₁₀	mg/m ³	25	KSA: 25
		Opacity	%	20	
Printing / Publishing		VOC	mg/m ³	100	IFC:100
		PM ₁₀	mg/m ³	50	IFC: 50 (30 minute mean for contained sources)
		NO _x	mg/m ³	100	IFC: 100
Lead Acid Battery Plants	Lead reclamation facility	Pb	mg/m ³	4.5	KSA: 4.5
	Grid casting facility	Pb	mg/m ³	0.4	KSA: 0.4
		Opacity	%	0	KSA: 0

	Paste Mixing Facility	Pb	mg/m³	1.0	KSA: 1.0
		Opacity	%	0	KSA: 0
Pharmaceutical Plants		PM ₁₀	mg/m³	30	Oman: 30, IFC: 20
		VOC	mg/m³	35	Oman: 35, IFC: 20
		NH ₃	mg/m³	20	Oman: 20, IFC: 30
		CS ₂	mg/m³	1.5	Oman: 1.5
Phosphate Fertilizer		F	mg/m³	5	IFC: 5
		PM ₁₀	mg/m³	50	IFC: 50
		NH ₃	mg/m³	50	IFC: 50
		HCl	mg/m³	30	IFC: 30
		NO _x	mg/m³	500	IFC: 500
Polymer Manufacturing		PM ₁₀	mg/m³	20	IFC: 20
		SO ₂	mg/m³	500	IFC: 500
		NO _x	mg/m³	300	IFC: 300
		HCl	mg/m³	10	IFC: 10
		Ammonia	mg/m³	15	IFC: 15
		VOCs	mg/m³	20	IFC: 20
		Formaldehyde	mg/m³	0.15	IFC: 0.15
Cement Plants		PM ₁₀	mg/m³	50	Oman: 100, IFC: 30
		Opacity	%	10	KSA: 10
		SO _x	mg/m³	35	Oman: 35, IFC: 400
		NO _x	mg/m³	600	IFC: 600
Textile Plants	Finishing, drying, use of solvents.	PM ₁₀	mg/m³	50	IFC: 50
		VOC	mg/m³	20	IFC: 20
		Chlorine	mg/m³	5	IFC: 5
		Formaldehyde	mg/m³	20	IFC: 20
		Ammonia	mg/m³	30	IFC: 30

m³ refers to a standard cubic meter at standard temperature and pressure

Ambient Air Quality Standards

Pollutant	Symbol	Duration of Exposure	Unit	Measurement	
				NEOM Standard	Reference
Benzene	C ₆ H ₆	1 hour	µg/m ³	30	KSA-RCJY 30
		24 hours Yearly		3	GER 5, KSA-RCJY 3
Lead and inorganic lead compounds		1 hour	µg/m ³	1.5	KSA-RCJY 1.5
		24 hours		0.5	KSA-RCJY 0.5
		Monthly		0.2	KSA-RCJY 0.2
		Yearly		0.5	GER 0.5, KSA-PME 0.5
Sulphur Dioxide	SO ₂	10 minutes	µg/m ³	500	IFC 500
		1 hour		350	KSA 730, UAE 350, EU 350
		24 hours		125	IFC 20, KSA 365, UAE 150, EU 125
		Yearly		50	KSA 80, UAE 50, GER 50
Nitrogen Dioxide	NO ₂	1 hour	µg/m ³	200	IFC 200, KSA 660, UAE 290, EU 200
		24 hours		150	UAE 110
		Yearly		40	IFC 40, KSA 100, EU 40
Particulate Matter	PM ₁₀	24 hours	µg/m ³	20*	IFC 20, KSA 340, UAE 150, EU 50, USA 150, AUS 50. Note: EU, USA and Australian standards are not relevant to a Middle Eastern country with higher background levels of airborne particulates.
	PM _{2.5}	24 hours Yearly	µg/m ³	35* 15*	IFC 24-hour: 75 (Interim target-1), 50 (Interim target-2), 37.5 (Interim target-3), 25 (guideline) IFC 1-year: 35 (Interim target-1), 25 (Interim target-2), 15 (Interim target-3), 10 (guideline)
Tetrachloroethene		1 hour	µg/m ³	250	KSA-RCJY 250
		24 hours Yearly		10	GER 10
Hydrogen fluorides and inorganic gaseous compounds of fluorine		1 hour	µg/m ³	4.9	KSA-RCJY 4.9
		24 hours Yearly		0.4	GER 0.4
Ozone		8-hour daily maximum	µg/m ³	100	IFC 160 (interim target), IFC 100 (guideline)
		1 hour daily average in 30 days		235	KSA 295, KSA-RCJY 235

* above ambient level