



# Abu Dhabi Specification

معايير أبوظبي الفنية



ADS 19/2017

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Environmental Specification  
for Soil Contamination

المعايير البيئية لتلوث التربة



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## About the Abu Dhabi Quality and Conformity Council

The Abu Dhabi Quality and Conformity Council (QCC) was established by law No. 3 of 2009, issued by His Highness Sheikh Khalifa Bin Zayed Al Nahyan, President of the UAE.

QCC is responsible for the development of Abu Dhabi Emirate's quality infrastructure, which enables industry and regulators to ensure that products, systems and personnel can be tested and certified to UAE and international standards.

Products certified by QCC receive the Abu Dhabi Trustmark. The Trustmark is designed to communicate that a product or system conforms to various safety and performance standards that are set by Abu Dhabi regulators.

### 1. Foreword

The QCC Soil Contamination Specification working group was established in April 2016 with a view to reviewing all the existing standards related to the subject with the object of harmonizing the required standard to be agreed by all the relevant entities at the level of Abu Dhabi Emirate. Abu Dhabi Specifications (ADS) will be developed on subjects that have no specifications or local legislation and will then be put forward to ESMA as proposed UAE Standards.

### 2. Purpose

Numerical values for levels of contaminants in soil that are protective of human health and the environment are important tools in assessing contaminated sites. The purpose of the specifications is to ensure that sites affected by contaminants are appropriately identified and assessed by the competent authority and, if necessary, remediated or the contaminants contained to make the site safe for human use.

The specifications propose two types of guideline values:

- Concentrations of contaminants that do not pose a risk to human health and where remedial action is not required.
- Concentrations levels of contaminants that may pose a risk to human health and trigger remediation and/or management actions.



### 3. Acknowledgement

QCC would like to thank the members of the Working Group listed below.

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17. Eng. Rhea Selwan	MASDAR
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#### 4. Scope

This Abu Dhabi Specifications (ADS) recommend environmental criteria for soil quality that is suitable for the following usages in Abu Dhabi Emirate: residential/open spaces, industrial/commercial, and agricultural uses. The specifications do not have jurisdiction within:

- Land or operations under the control of the Union Defense Force or the Abu Dhabi Defense Force;
- Concession areas of Abu Dhabi National Oil Company (ADNOC);
- Land and operations of the Emirates Nuclear Energy Corporation (ENEC), Barakah nuclear power station.

#### 5. Terms and definitions

TERM	DEFINITION
Accredited Laboratory	The laboratory providing soil quality testing services accredited in accordance with International Standard ISO/IEC 17025:2005- General Requirements for the Competence of Testing and Calibration Laboratories. The scope of accreditation shall cover all requirements of these specifications, as well as for operation of the laboratory quality management system.
Agricultural Land Use	Growing of crops including nursery, biomass, and horticultural crops; raising of livestock; aquaculture; and agro-forestry. This does not include growing of crops consumed by human.
Clean-up Level	Concentration of a given contaminant for a specific use based on an increased risk of cancer of 1 in 10,000 and a hazard quotient of 1. Exceedances of the clean-up levels will trigger remediation and/or management actions.
Commercial Land Use	Area of commercial activity including retail sales, commercial services, food services, petrol stations, car wash, pet and animal sales and services, offices, office business parks, and entertainment/leisure, and hotels/resorts.
Competent Authority	The Environment Agency – Abu Dhabi (EAD) is the competent authority for the Emirate of Abu Dhabi responsible for environmental affairs.
Industrial Land Use	Area of industrial use including manufacturing, warehousing or storage, shipping facilities, and light industrial. Also included are areas of hazardous industrial use and extraction (above-ground mines/quarries and oil field structures).
Land User	An individual, company, or group that owns or operates lands for any designated use.



TERM	DEFINITION
Open Spaces	Developed area dedicated to recreation or set aside as developed open space, including public gardens/parks, plaza and fountains, play grounds, public beaches, sports clubs, race courses, golf courses, and tourist camps. Also includes archeological sites. This class does not include undeveloped dedicated open space such as environmental or civic reserves.
Remediation Measures	Measures taken to ensure that human health and the environment are protected from land contamination.
Residential Land Use	Area of human habitation dwellings including single-unit and multi-unit residential, assisted living facilities, and employment housing. Linear residential developments along the shoreline, neighboring islands, and transportation routes extending outward from urban areas are included as residential.
Screening Level	Concentration of a given contaminant for a specific use based on an increased cancer risk of 1 in 100,000 across the population.
Soil Contamination	The build-up in soils of persistent toxic compounds, chemicals, or disease causing agents, which have adverse impacts on human health and/or the environment.

## 6. General Requirements

- Soil quality for residential/open spaces, industrial/commercial, and agricultural uses shall comply with the requirements of these specifications.
- EAD shall check compliance of the soil quality with requirements of these specifications as part of its permitting/enforcement processes, and as per requirements of the Environment Impact Assessment (EIA) process approved by EAD.
- The land user shall submit to the competent authority, once every five years, documents that show soil quality as per requirements of these specifications.
- In special cases and in order to assess and manage risks on public health and the environment, the competent authority may ask for additional requirements other than these mentioned in the specifications, these may include soil gases/vapors for volatile chemicals.
- The competent authority may also test for additional basic soil properties (physical, chemical) to get addition insight on the context of the soil for better interpretation of the soil quality data.

## 7. Technical Requirements

- Soil quality for residential/open space land uses shall comply with the properties listed in Table (1).
- Soil quality for industrial/commercial land uses shall comply with the properties listed in Table (2).
- Soil quality for agricultural land uses shall comply with the properties listed in Table (3).
- No remediation action is required if the soil quality does not exceed the screening levels.
- Further investigation and management actions are required as per requirements of the competent authority in case the soil quality exceeds the screening levels but do not exceed the clean-up levels.
- In case the soil quality exceeds the clean-up levels for the designated land use, remediation measures shall be implemented as per requirements of the competent authority. All remediation plans shall be prepared as per the prevailing and proven environmental technologies for site remediation. In addition, all remediation plans and measures shall be approved by the competent authority on a case-by-case basis.
- The land user shall bear all entailed costs of the remediation measures in case there is a need for such measures.
- EAD has the right to collect and analyze soil samples with the appropriate frequency to check compliance with requirements of these specifications.

Table (1): Maximum allowable soil contaminants for residential/open space use

Parameter	Unit	Screening level	Clean-up level
Antimony (Sb)	mg/kg (DW)	31	310
Arsenic (As)	mg/kg (DW)	6.8	68
Beryllium (Be)	mg/kg (DW)	160	1600
Cadmium (Cd)	mg/kg (DW)	71	710
Chromium (Cr VI)	mg/kg (DW)	3	30
Cyanide (CN)	mg/kg (DW)	2.7	27



Cobalt (Co)	mg/kg (DW)	23	230
Copper (Cu)	gm/kg (DW)	3.1	31.0
Lead (Pb)	gm/kg (DW)	4.0	40.0
Manganese (Mn)	gm/kg (DW)	1.8	18.0
Mercury (Hg)	mg/kg (DW)	11	110
Molybdenum (Mo)	mg/kg (DW)	390	3900
Nickel (Ni)	gm/kg (DW)	1.5	15.0
Selenium (Se)	mg/kg (DW)	390	3900
Asbestos	gm/10 kg (DW)	1.0	1.0
Benzene	mg/kg (DW)	12	120
Toluene	gm/kg (DW)	4.9	49
Ethylbenzene	mg/kg (DW)	58	580
Xylene	mg/kg (DW)	580	5800
Polychlorinated Biphenyls	mg/kg (DW)	13.0	130
Benzo(a)pyrene (BaP)	mg/kg (DW)	0.16	1.6
Trichloroethylene (TCE)	mg/kg (DW)	4.1	41
Vinyl Chloride (C <sub>2</sub> H <sub>3</sub> Cl)	mg/kg (DW)	0.59	5.9

Note: DW: dry weight

Table (2): Maximum allowable soil contaminants for industrial/commercial use

Parameter	Unit	Screening level	Clean-up level
Antimony (Sb)	mg/kg (DW)	470	4700
Arsenic (As)	mg/kg (DW)	30	300
Beryllium (Be)	gm/kg (DW)	2.3	23.0
Cadmium (Cd)	mg/kg (DW)	980	9800
Chromium (Cr VI)	mg/kg (DW)	63	630
Cobalt (Co)	mg/kg (DW)	350	3500
Lead (Pb)	gm/kg (DW)	8.0	80
Mercury (Hg)	mg/kg (DW)	46	460
Nickel (Ni)	gm/kg (DW)	22	220
Selenium (Se)	gm/kg (DW)	5.8	58



Asbestos	gm/10 kg (DW)	5.0	5.0
Benzene	mg/kg (DW)	51	510
Toluene	gm/kg (DW)	47	470
Ethylbenzene	mg/kg (DW)	250	2500
Xylene	gm/kg (DW)	2.5	25.0
Benzo (a) pyrene (BaP)	mg/kg (DW)	2.9	29
Polychlorinated Biphenyls	mg/kg (DW)	330	3300

Note: DW: dry weight

Table (3): Maximum allowable soil contaminants for agricultural use

Parameter	Unit	Screening level	Clean-up level
Antimony (Sb)	mg/kg (DW)	200	2000
Arsenic (As)	mg/kg (DW)	120	1200
Beryllium (Be)	mg/kg (DW)	40	400
Boron (B)	mg/kg (DW)	20	200
Cadmium (Cd)	mg/kg (DW)	14	140
Chromium (Cr VI)	mg/kg (DW)	4	40
Cobalt (Co)	mg/kg (DW)	400	4000
Lead (Pb)	gm/kg (DW)	0.7	7.0
Mercury (Hg)	mg/kg (DW)	66	660
Molybdenum (Mo)	mg/kg (DW)	50	500
Nickel (Ni)	mg/kg (DW)	450	4500
Selenium (Se)	mg/kg (DW)	10	100
Total PAHs	mg/kg (DW)	6	60
Asbestos	gm/10 kg (DW)	1.0	1.0

Note:

1. DW: dry weight
  2. This does not include soil quality for growing of crops consumed by human
- The land owner shall collect and analyze soil samples as per the requirements of these specifications and submit test reports to EAD.



- It is recommended that, where possible, “background” control points be identified to act as a reference point in determining the levels of contamination against pre-existing concentrations.
- Soil samples shall be collected from more than one depth at each sampling location. Where contamination is identified, the maximum depth (where practicable) to which that contamination extends should be determine.
- The overall process for assessment, remediation and management of contaminated sites is shown in Figure 1. For more details refer to the “Soil Contamination User Guide” issued by EAD in November 2016

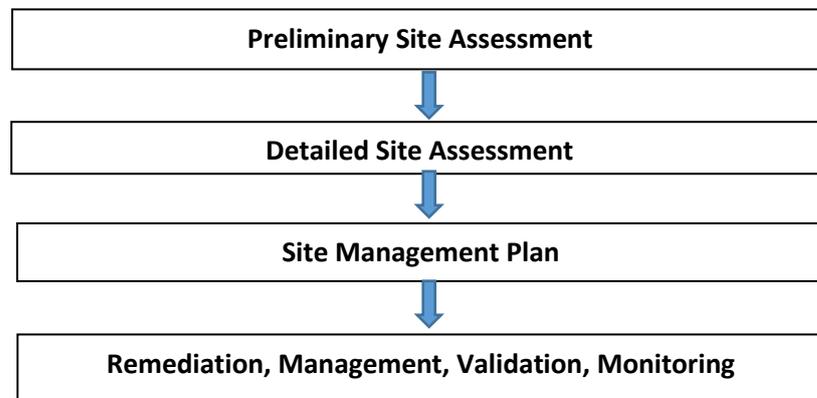


Figure 1: Process for assessment, remediation and management of contaminated sites

### 3. Quality Control

- Collection of soil samples shall be conducted in accordance with the standard operating procedures issued by the competent authority, or any equivalent sampling procedures approved by the competent authority.
- Samples collected shall be representative of the piece of land in concern. For more details refer to the “Soil Contamination User Guide” issued by EAD in November 2016.
- Duplicate samples (with frequency of 1 per 20 primary samples) shall be obtained and analyzed to evaluate the overall precision of the sampling and/or analytical methods.



- Testing shall be conducted as per the testing procedures of Soil Science Society of America (SSSA) or United States Environmental Protection Agency (US EPA) or any equivalent testing procedures approved by EAD.
- The laboratory providing soil quality testing services shall continuously maintain full accreditation in accordance with International Standard ISO/IEC 17025:2005- General Requirements for the Competence of Testing and Calibration Laboratories. This accreditation shall cover full technical competence for each of the test methods, as well as for operation of the laboratory quality management system.



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