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Air quality -- Exchange of data -- Part 1: General data format

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Qualité de l'air -- Échange de données -- Partie 1: Format général de données
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INTERNATIONAL STANDARD

ISO
7168-1

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1999-07-01

Air quality — Exchange of data —

Part 1: General data format

Qualité de l'air — Échange de données —

Partie 1: Format général de données

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7168-1 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 4, *General aspects*.

ISO 7168 consists of the following parts, under the general title *Air quality — Exchange of data*:

- *Part 1: General data format*
- *Part 2: Condensed data format*

The first editions of the several parts of ISO 7168 together cancel and replace the first edition (ISO 7168:1985), which has been technically revised.

Annexes A, B and C form a normative part of this part of ISO 7168. Annexes D and E are for information only.

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Introduction

For the interpretation or comparison of air quality data, the data themselves are usually not sufficient. Other information may be needed for a proper evaluation, e.g. basic information on the measurement, such as

- object of the measurements,
- place of sampling,
- date of sampling,

or additional information, such as

- the measuring method used,
- sampling period of a single measurement,
- characteristics of the sampling site,
- validity of the data.

In some cases, the user will need other information to be compared with the measured data in conformity with regulations or to enable certain complex processing operations to be performed, e.g.

- additional meteorological data,
- geographical and economic data,
- data on localized or diffuse atmospheric emissions.

The transmission of such information in a data file is not mandatory. Where necessary and possible, this supplementary information may be attached to a data file as comment.

ISO 7168-1 specifies the general data format for the exchange of air quality data. This general data format supports both the direct readability and the automated processing of data files. Each information presented in a data file prepared in accordance with ISO 7168-1 is related to a defined keyword and therefore consistently self-explanatory. The general data format is intended for the international exchange of air quality data.

ISO 7168-2 [1] specifies a condensed data format which is intended only for the exchange of data files between automatic data processing systems. A good knowledge of the file structure is necessary for the interpretation of these data files.

Air quality — Exchange of data —

Part 1: General data format

1 Scope

This part of ISO 7168 specifies a general format for the exchange of air quality data and related information. It defines mandatory and optional keywords to identify the data presented in a data file, and the values and formats of the data allocated to a keyword.

This part of ISO 7168 is recommended for the international exchange of air quality data. It is also intended for direct data import, e.g. into spreadsheets.

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2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 7168. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 7168 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 646, *Information technology — ISO 7-bit coded characters set for information exchange*.

ISO 1000:1992, *SI units and recommendations for the use of their multiples and of certain other units*.

ISO 3166-1:1997, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*.

ISO 3534-1:1993, *Statistics — Vocabulary and symbols — Part 1: Probability and general statistical terms*.

ISO 4226:1993, *Air quality — General aspects — Units of measurement*.

ISO 6709:1983, *Standard representation of latitude, longitude and altitude for geographic points location*.

ISO 6879:1995, *Air quality — Performance characteristics and related concepts for air quality measuring methods*.

ISO 8756:1994, *Air quality — Handling of temperature, pressure and humidity data*.

3 Terms and definitions

For the purposes of this part of ISO 7168, the terms and definitions given in ISO 6879 and the following apply.

3.1

air quality characteristic

one of the quantifiable properties relating to an air mass under investigation

EXAMPLE Concentration of a constituent.

3.2

air quality data set

set of values for the description of air quality transmitted by the data file

3.3

air quality datum

value of the air quality characteristic

3.4

data

air quality data and general data

3.5

general data

additional data, other than air quality data, needed for a proper evaluation of the air quality data transmitted

3.6

keyword

unique identifier of data presented in a data file in the English language

3.7

level descriptor

unique identifier of a hierarchical level in a data file in the English language

EXAMPLE The group, block or record level.

4 Symbols and abbreviated terms

CR	Carriage return
dec	decimal
LF	Line feed
RNL	Return to new line
UT	Universal time

5 File format

5.1 Overview

The data file is structured by groups, blocks and records representing the hierarchical levels of the file (see Figure 1).

A group is the highest hierarchical level in a data file. It may contain thematically related blocks, records and data.

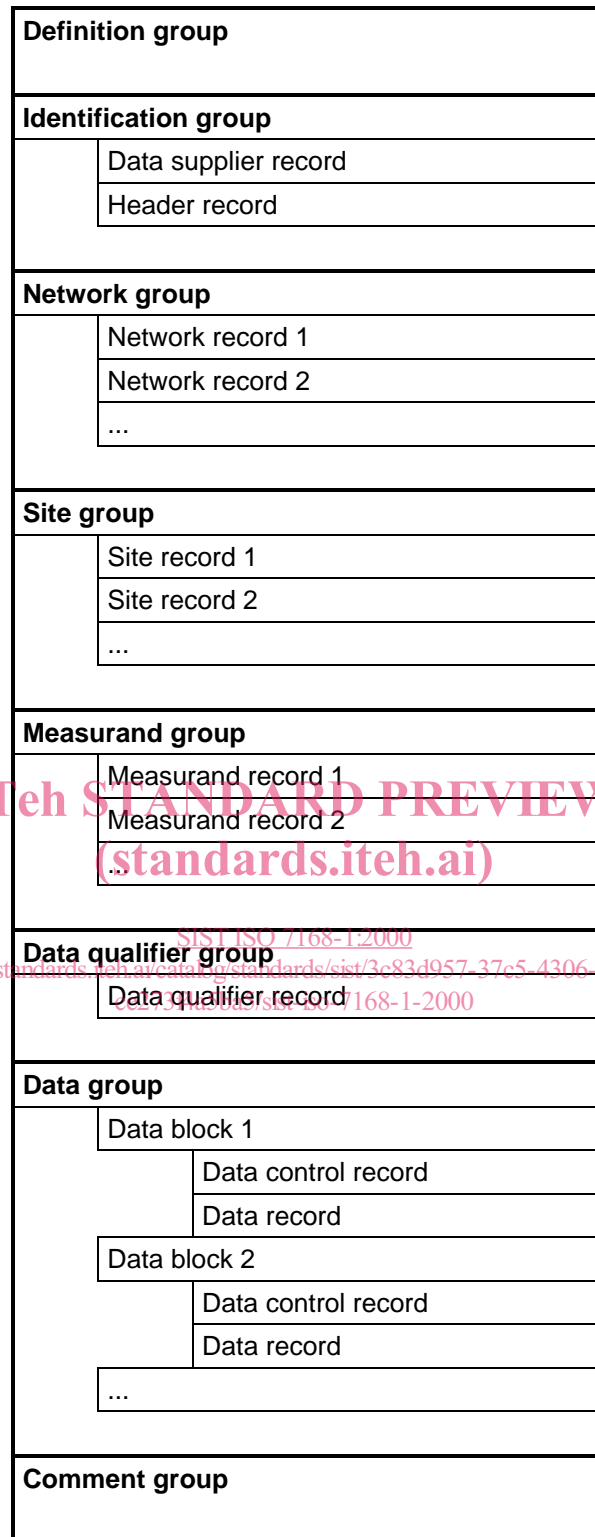


Figure 1 — Data file structure

A block is the second hierarchical level, and is only used within a data group. It contains records and gives control to the blocks of air quality data.

A record is the third hierarchical level. It is used to structure the contents of an actual group or the data block. A record contains keywords and related data and, in the case of the data record, the air quality data transmitted. In a data group, the records are controlled by the block level.

The datum level is the lowest hierarchical level.

5.2 Construction of data files

Data files shall be constructed in accordance with the following rules.

- a) The data file shall be in compliance with the international information exchange code defined in ISO/IEC 646 (see annex A). Specific national characters shall not be used for the presentation of air quality data. Furthermore, certain control characters shall not be used in the data file (shaded characters in Table A.1 of annex A).
- b) To enable direct reading of print-outs, a return to new line (RNL) code shall be placed at the end of each line. The RNL consist of a line feed plus carriage return (decimal codes 13 and 10) to enable readability of the files on different operating systems. For some operating systems, the application software will need to create the RNL double character to be used in air quality data files.
- c) The maximum length of line is 255 characters, including the RNL code only at the end of the data.
- d) Each level descriptor or keyword shall begin at a new line.
- e) Only keywords and level descriptors defined in Table 1 shall be used in accordance with 6.2.
- f) Data presented in a group or record shall be allocated to a keyword.
- g) Each keyword shall be followed by a combination of an equal sign and a data separator "=", to separate the keyword from the data.
- h) Values and formats of data shall be in accordance with the specifications of 6.3 and 6.4 and Table 1.
- i) In cases specified in 6.3 and Table 1, data may be presented as a sequence. Each datum shall be separated from the previous one by a data separator, i.e. a semicolon.
- j) Blank characters are disregarded in the file except for the format <text>. They may be used for indenting to create legible files, and their number and position in the file is of no importance except for the format <text>.
- k) Comments shall be placed between curly brackets "{}" either on a separate line or at the end of a line.
- l) No distinction is made between upper- and lower-case letters.
- m) Information to be presented in the text format shall be placed within quotation marks (decimal code 34).
- n) Within a group, block or record, the order of keywords may be changed.

Table 1 — Level descriptors and keywords

Level descriptor / Keyword	Use ^a	Format ^b	Fixed ^c	Value ^d	Definition in
[definition_group]	M				6.3.2
file_name	M	<text>			6.3.2.1
file_creation_date	M	<time>			6.3.2.2
file_data_status	M	<text>	x	"unvalidated" "validated"	6.3.2.3
file_data_separator	M		x	; {semicolon}	6.3.2.4
file_decimal_separator	M		x	, {comma}	6.3.2.5
file_comment_separators	M		x	{ }	6.3.2.6
file_format	M	<text>	x	"ISO7168-1:1998"	6.3.2.7
[identification_group]	M				6.3.3
[data_supplier_record]	M				6.3.3.1
data_supplier_name	M	<text>			6.3.3.1.1
data_supplier_code	O	<text>			6.3.3.1.2

Level descriptor / Keyword	Use ^a	Format ^b	Fixed ^c	Value ^d	Definition in
data_supplier_address	M	<sequence of text>			6.3.3.1.3
data_supplier_responsible	O	<text>			6.3.3.1.4
data_supplier_phone_number	O	<text>			6.3.3.1.5
data_supplier_fax_number	O	<text>			6.3.3.1.6
data_supplier_email_address	O	<text>			6.3.3.1.7
data_supplier_country_name	M	<text>	x		6.3.3.1.8
data_supplier_country_code	M	<text>	x		6.3.3.1.9
[header_record]	M				6.3.3.2
number_of_network_records	M	<numerical>			6.3.3.2.1
number_of_site_records	M	<numerical>			6.3.3.2.2
number_of_measurand_records	M	<numerical>			6.3.3.2.3
number_of_data_blocks	M	<numerical>			6.3.3.2.4
[network_group]	M				6.3.4
[network_record]	M				6.3.4.1
network_country_code	M	<text>			6.3.4.1.1
network_name	M	<text>			6.3.4.1.2
network_short_name	O	<text>			6.3.4.1.3
network_address	M	<sequence of text>			6.3.4.1.4
network_responsible	O	<text>			6.3.4.1.5
network_phone_number	O	<text>			6.3.4.1.6
network_fax_number	O	<text>			6.3.4.1.7
network_email_address	O	<text>			6.3.4.1.8
network_start_time	M	<time>			6.3.4.1.9
network_end_time	M	<time>			6.3.4.1.10
network_coverage	O	<text>			6.3.4.1.11
network_time_reference	M	<text>	x	"local" "UT"	6.3.4.1.12
[site_group]	M				6.3.5
[site_record]	M				6.3.5.1
site_network_country_code	M	<text>			6.3.5.1.1
site_name	M	<text>			6.3.5.1.2
site_address	M	<sequence of text>			6.3.5.1.3
site_responsible	O	<text>			6.3.5.1.4
site_start_time	M	<time>			6.3.5.1.5
site_end_time	M	<time>			6.3.5.1.6
site_type	M	<text>	x		6.3.5.1.7
site_scale	O/M	<sequence of text>	x		6.3.5.1.8
site_scale_code	O/M	<numerical>	x		6.3.5.1.9
site_time_minus_UT	M	<time>			6.3.5.1.10
site_latitude	M	<text>			6.3.5.1.11
site_longitude	M	<text>			6.3.5.1.12
site_altitude	M	<text>			6.3.5.1.13
site_geodesic_system	O	<text>			6.3.5.1.14
site_zone_type	O/M	<text>	x		6.3.5.1.15
site_zone_type_code	O/M	<numerical>			6.3.5.1.16

Level descriptor / Keyword	Use ^a	Format ^b	Fixed ^c	Value ^d	Definition in
site_zone_characterization	O/M	<sequence of text>	x		6.3.5.1.17
site_zone_characterization_code	O/M	<numerical>			6.3.5.1.18
site_inhabitants	O	<numerical>			6.3.5.1.19
site_emission_sources	O/M	<sequence of text>	x		6.3.5.1.20
site_emission_sources_code	O/M	<numerical>	x		6.3.5.1.21
site_traffic_volume	O	<text>	x		6.3.5.1.22
site_traffic_volume_number	O	<numerical>			6.3.5.1.23
site_lorry_percentage	O	<numerical>			6.3.5.1.24
site_street_type	O	<text>	x		6.3.5.1.25
site_traffic_situation	O	<text>	x		6.3.5.1.26
[measurand_group]	M				6.3.6
[measurand_record]	M				6.3.6.1
measurand_code	M	<text>	x		6.3.6.1.1
measurand_name	M	<text>	x		6.3.6.1.2
measurand_unit	M	<text>	x		6.3.6.1.3
measurement_method	M	<text>			6.3.6.1.4
measurement_method_standard	M	<text>			6.3.6.1.5
measurement_type	O	<sequence of text>	x	"automatic" "manual"	6.3.6.1.6
measurement_device	O	<text>			6.3.6.1.7
measurement_start_time	O	<time>			6.3.6.1.8
measurement_end_time	O	<time>			6.3.6.1.9
calibration_method	O	<text>			6.3.6.1.10
calibration_method_standard	O	<text>			6.3.6.1.11
calibration_type	O	<sequence of text>	x	"automatic" "manual"	6.3.6.1.12
calibration_period	O	<time>			6.3.6.1.13
reference_temperature	M	<numerical>			6.3.6.1.14
reference_temperature_unit	M	<text>	x	"kelvin" "degree Celsius"	6.3.6.1.15
reference_pressure	M	<numerical>			6.3.6.1.16
reference_pressure_unit	M	<text>	x	"pascal" "kilopascal"	6.3.6.1.17
length_unit	M	<text>	x	"metre"	6.3.6.1.18
sampling_location	O	<text>			6.3.6.1.19
sampling_height	M	<numerical>			6.3.6.1.20
sampling_line_length	O	<numerical>			6.3.6.1.21
lower_limit	O	<numerical>			6.3.6.1.22
upper_limit	O	<numerical>			6.3.6.1.23
quantification_limit	O	<numerical>			6.3.6.1.24
measurement_uncertainty	O	<numerical>			6.3.6.1.25
[data_qualifier_group]	M				6.3.7
[data_qualifier_record]	M				6.3.7.1
calibration_drift	O	<text>	x	"D"	6.3.7.1.1
calibration_mode	O	<text>	x	"C"	6.3.7.1.2

Level descriptor / Keyword	Use ^a	Format ^b	Fixed ^c	Value ^d	Definition in
corrected_datum	O	<text>	x	"O"	6.3.7.1.3
estimated_datum	O	<text>	x	"E"	6.3.7.1.4
faulty_measurement	O	<text>	x	"F"	6.3.7.1.5
invalid_datum	O	<text>	x	"I"	6.3.7.1.6
maintenance_mode	O	<text>	x	"M"	6.3.7.1.7
no_datum	O	<text>	x	"N"	6.3.7.1.8
usable_datum	O	<text>	x	"U"	6.3.7.1.9
zero_mode	O	<text>	x	"Z"	6.3.7.1.10
[data_group]	M				6.3.8
[data_block]	M				6.3.8.1
[data_control_record]	M				6.3.8.1.1
measurand_code	M	<sequence of text>	x		6.3.8.1.1.1
site_network_country_code	M	<sequence of text>			6.3.8.1.1.2
data_start_time	M	<time>			6.3.8.1.1.3
data_duration	M	<time>			6.3.8.1.1.4
data_number	M	<numerical>			6.3.8.1.1.5
data_time_interval	M	<time>			6.3.8.1.1.6
data_samples_per_time_interval	M	<numerical>			6.3.8.1.1.7
data_sampling_time	M	<time>			6.3.8.1.1.8
data_multiplication_factor	O	<numerical>			6.3.8.1.1.9
data_type	M	<text>	x		6.3.8.1.1.10
data_type_code	M	<numerical>	x		6.3.8.1.1.11
data_type_parameter	O/M	<numerical>			6.3.8.1.1.12
data_columns	O/M	<numerical>			6.3.8.1.1.13
[data_record]	M				6.3.8.1.2
data	M	<data>			6.3.8.1.2.1
[comment_group]	O				6.3.9

^a M: Mandatory use; O: Optional use.

^b Permissible formats are presented in angle brackets.

^c A cross (x) in this column indicates that fixed values specified in a list shall be used as information.

^d Fixed values are presented in Table 1 if only one or two fixed values are permitted. For all other cases, refer to the specified subclause.

6 Specifications

6.1 Creation of file names

6.1.1 General

The file name is deliberately restricted to eight characters plus one full stop plus three characters (i.e. eleven characters). Parametering of the file name enables the identification of the content of the file. This includes information about the measurement location and the date of the measurement. The parameters used for the construction of file names are defined in Table 2.

Table 2 — Parameters for constructing file names

Parameter	Description	Number of characters	Value/Format ^a
CC	Country of origin of the data	2	<alphanumeric>
NN	Measurement network	2	<alphanumeric>
SSSS	Measuring station	4	<alphanumeric>
YY	Year of measurement date	2	00 to 99
MM	Month of measurement date	2	01 to 12
DD	Day of measurement date	2	01 to 31
X	Unused field in the file name	1	- {hyphen} or letter A to Z
Q	File qualifier	1	see Table 3

^a Permissible formats are presented in angle brackets.

Table 3 — Values of file qualifier Q

Value of Q	Description
\$	International validated data file
&	International unvalidated data file
V	Internal validated data file
U	Internal unvalidated data file
I	Internal incomplete data file

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6.1.2 File names for international exchange of data

6.1.2.1 General

For the international exchange of air quality data, the file name shall consist of eight characters plus one full stop plus three characters. The most righthand position in the file name is reserved for the file qualifier, which specifies whether the file includes e.g. validated or unvalidated data for international purposes (see Table 3).

The country code shall be in accordance with the alpha-2 code of ISO 3166-1 (see examples in annex D). The two characters of the network code shall be unique regarding the networks of the related country. If the file includes data from several networks of the same country, then the associated character fields are filled with hyphens, i.e. NN = --.

6.1.2.2 Daily international file

A daily file includes information within a day. The file name shall be constructed in the following way:

C	C	N	N	D	D	M	M	.	Y	Y	Q
---	---	---	---	---	---	---	---	---	---	---	---

EXAMPLE "DE121505.96\$"

- Daily file with validated data from 15th May 1996
- Country of origin: Germany
- Network code: 12

6.1.2.3 Monthly international file

A monthly file includes information within a month. Different files may be distinguished by letters A to Z in unused fields (X). The file name shall be constructed in the following way:

C	C	N	N	X	X	M	M	.	Y	Y	Q
---	---	---	---	---	---	---	---	---	---	---	---

EXAMPLE "FRG6-A12.97&" and "FRG6-B12.97&"

- a) Monthly files A and B with unvalidated data from December 1997
- b) Country of origin: France
- c) Network code: G6

6.1.2.4 Annual international file

An annual file includes information within a year. Different files may be distinguished by letters A to Z in unused fields (X). The file name shall be constructed in the following way:

C	C	N	N	X	X	X	X	.	Y	Y	Q
---	---	---	---	---	---	---	---	---	---	---	---

EXAMPLE "GBX1----.98\$"

- a) Annual file with validated data from year 1998
- b) Country of origin: United Kingdom

- c) Network code: X1

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6.1.2.5 Multiannual international file

A multiannual file includes information covering more than a year. Different files may be distinguished by letters A to Z in unused fields (X). The file name shall be constructed in the following way:

C	C	N	N	X	X	X	X	.	X	X	Q
---	---	---	---	---	---	---	---	---	---	---	---

EXAMPLE "USN5----.G-\$" and "USN5----.H-\$"

- a) Multiannual files G and H with validated data; time information is specified in the data file
- b) Country of origin: United States
- c) Network code: N5

6.1.3 File names for internal exchange of data

6.1.3.1 General

For the internal exchange of air quality data, the file name consists of eight characters plus one full stop plus three characters. The most righthand position in the file name is reserved for the file qualifier, which specifies the internal status of the file according to Table 3.

NOTE Internal exchange of data means, for example, exchange between stations or networks within a country.