INTERNATIONAL STANDARD

ISO 11788-1

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Electronic data interchange between information systems in agriculture — Agricultural data element dictionary —

Part 1: General description

Échange de données informatisé entre systèmes d'information en agriculture — Dictionnaire de données agricoles —

Partie 1: Description générale

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Contents

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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.

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 11788 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 19, *Agricultural electronics*.

ISO 11788 consists of the following parts, under the general title *Electronic data interchange between information systems in agriculture — Agricultural data element dictionary*:

— *Part 1: General description*

— *Part 2: Dairy farming*

— *Part 3: Pig farming*

— *Part 4: Poultry farming*

— *Part 5: Non-animal stationary application*

Annex A forms an integral part of this part of ISO 11788. Annexes B and C are for information only.

Introduction

Standalone computers on the farm require that data must be manually entered and collected from the different computers. This is a laborious task which becomes superfluous when the computers are interconnected and able to communicate with each other automatically to share and exchange information. Information exchange means data transport between the management computer on one side and each process computer on the other side.

An agricultural data element dictionary (ADED) consists of data elements that may be used in the agricultural sector to exchange data electronically. ADED is closely linked to agricultural data interchange syntax (ADIS), which is a syntax used in the agricultural sector to exchange data electronically. ADED in combination with ADIS makes electronic data interchange possible.

In a data element dictionary all data elements are described in a unique way. Each element is uniquely identified by a data dictionary number (DD number). Data dictionaries for data exchange between management computers and process computers may be subsets of larger data dictionaries.

The standardization of on-farm data interchange between management computer and stationary process computers consists of an ADIS and an ADED. ADIS is described in ISO 11787. A general description of ADED is given in this part of ISO 11788, the other parts of ISO 11788 describe data dictionaries for different fields of application.

This part of ISO 11788

— describes the general structure of an agricultural data element dictionary;

— lists the attributes of data elements and entities;

— gives the header structure (an entity that is used in all data interchanges, independent of the field of application).

NOTE — The term "process computer" can also be read as "datalogger".

Electronic data interchange between information systems in agriculture — Agricultural data element dictionary —

Part 1:
General description

1 Scope

The data elements described in ISO 11788 are intended for communication between on-farm process computers and management computers. This part of ISO 11788 specifies how an agricultural data element dictionary (ADED) may be used for on-farm data exchange.

The data elements concerning mobile equipment are not dealt with in this part of ISO 11788.

ADED data elements may be used for:

— direct data exchange between process computer and management program;

— data exchange between process computer and interface software of the process computer on the management computer (PC) (alternatively, manufacturer-specific methods may be used for this exchange);

— data exchange between the interface software for the process computer on the PC and the management program.

NOTE — This does not mean that agricultural data elements cannot be used for other data interchange. Many farmers use a method similar to ADIS to exchange data between management computers and external computers. ADED may be used for data interchange to external computers or to exchange data between independent software applications used on a management computer.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 11788. At the time of publication, the edition indicated was valid. All standards are subjected to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 11787:1995, *Machinery for agriculture and forestry — Data interchange between management computer and process computers — Data interchange syntax.*

3 Definitions

For the purposes of this part of ISO 11788, the following definitions apply.

3.1 agricultural data element dictionary (ADED)
description of standardized data elements used for agricultural purposes

3.2 agricultural data interchange syntax (ADIS)
syntax for data exchange between management computer and process computer on a farm

3.3 attribute
characteristic of an object or entity

3.4 data dictionary
database or list in which all data elements are described in a unique way

3.5 data element
unit of data for which the definition, identification, representation and permissible values are specified by means of a set of attributes

3.6 DD number
number that is used to identify a data element in a data dictionary with a 6-digit decimal code

3.7 electronic data interchange (EDI)
electronic transfer from computer to computer of commercial or administrative transactions using an agreed standard to structure the transaction or message data

3.8 entity
defined set of data elements

3.9 entity number
number used to identify an entity in an ADIS line (6-digit decimal code)

3.10 event
same meaning as the term entity

NOTE — In the description of ADIS syntax (ISO 11787) the term event is used. This standard uses the term entity.

3.11 index tree
set of all key data elements of an entity which defines the context of a particular data element in the ADIS data record by indicating which other data elements must be combined with it

4 Abbreviations

AN: Alphanumeric

C: Conditional

DD: Data Dictionary

K: Key data element

M: Mandatory

N: Numeric

O: Optional

Obl: Obligation

5 Requirements

5.1 General

The data to be exchanged between management computers and process computers shall be presented in standard files for data exchange on the management computer. For data exchange it is necessary that the data are known to both parties. The management system and the process computer system shall each provide the programs for conversion of its data to or from the standard files for data exchange. ADIS is needed to enter the data into the standard exchange file.

In order to handle information by computer, it is necessary that the sending and receiving computers use the same terminology. This terminology is the data element dictionary. Data elements shall be available for all branches of agriculture on an international level.

5.2 Procedures and levels of standardization

Several data dictionaries may be used for data exchange using ADIS (international ADED, national ADED, application specific data dictionary, manufacturer specific data dictionary, etc.). An internationally standardized ADED is needed to make exchange possible between systems of different manufacturers of different countries.

There are different standardization levels for data elements:

Level 1: Data elements are centrally registered on an international basis (ISO).
The first digit of the DD number for ISO-standardized data elements is 9.

Level 2: Data elements are centrally registered on a national basis.
The first digit of the DD number for national data elements is a number from 1 to 8.

Level 3: Data elements are manufacturer specific.
The first digit of the DD number for manufacturer-specific data elements is 0.
This range of "free numbers" may be used for manufacturer-specific experimenting. Manufacturers are advised to request a registered number to replace the manufacturer-specific number as soon as the element is implemented in an official release of their software.

A national agreement shall be reached for each new data element before it is brought to international attention. Reaching a national agreement is a matter which each country has to organize by itself through the national working groups for each subject area. When a new ADED element is proposed, it shall be agreed upon by all parties concerned. Once it has been agreed upon within the ISO structure, it achieves the status of an international ADED element, standardized by ISO.

5.3 Description of ADED

5.3.1 Reading ADED

The following decisions have been made concerning the international ADED:

— the identifier of a DD element shall be the 6-digit DD number, also called the ADED number;

— 65 positions are available for the name of the DD element;

— the data type of an element may be "alphanumeric" or "numeric". The data type "signed" is not used. Instead of "signed", "numeric" is used. This means that one of the available positions of the format length of the attribute is used for the minus sign;

— ISO units shall be used in the DD.

5.3.2 Main ADED characteristics

Both the sending and receiving party need to have a data dictionary, or a subset of it, which holds the characteristics of each data dictionary element. The main characteristics of ADED are:

— data elements use extended ASCII characters (ISO 8-bit code);

— data elements are part of at least one entity (see 5.3.4).

5.3.3 Data elements

The following attributes are described for each data element.

k ADED-number: the numbering of data elements of ADED starts with 900001, except for the data element "data dictionary type" which has the ADED-number 000 000. The numbering continues as running number without any other logical order.

m name

o synonyms

m definition

o comments

m format:

a) data type [alpha-numeric (AN), numeric (N)]

b) field length or total number of digits (if numeric)

c) resolution (equal to the number of decimal places)

m unit

o values (code set, minimum values, maximum values)

5.3.4 Entity

Within the communication field, a set of data elements that form a logical group is defined as an entity type for EDI. It consists of mandatory key data elements and other optional data elements.

There are different levels of standardization of entities (comparable to the standardization of data elements):

— The first two digits of centrally registered entities on an international level are 99. These are defined in advance and already known to all members of the communication group before receiving.

NOTE — Entity numbers start with 99 to avoid confusion with data element numbers.

— The first digit of centrally registered entities on a national level is a number from 1 to 8. These numbers are predefined and already known to all members of the communication group before receiving.

— The entity numbers are created by the system when writing an ADIS file. The entity number does not have a specified meaning. It may be used to identify different data blocks. In this case, the entity number starts with 0. Therefore entity numbers starting with a zero are free to be used by manufacturers.

— The entity number does not have any meaning: its value is "000000".

Each registered entity is described as a possible group of DD-numbers. The entity must start with the key data elements. The other elements are optional and have no specified order. National or manufacturer-specific data elements may be added to a registered entity.

When transferring a data element it is necessary to transfer the key data elements of the logical group (entity) to which it belongs. The set of key data elements (index tree) is not in the description of the data element but can be found in the entity description.

The following attributes are described for each entity.

m entity number: the numbering of entities of ADED starts with 990001. The numbering continues as running number without any other logical order.

m name

m definition

k key data element(s)

o data element(s)

The header is a specific entity which

— does not have key data elements;

— contains mandatory elements that are not key elements.

Annex A
(normative)
Header data

A.1 Description

990001 Header data
Data to be stored in the header-lines of the ADIS-file.

Obl	ADED-nr	Name
M	000000	Data dictionary type
M	900002	ADED ISO version
M	900003	File created or updated date
M	900004	File created or updated time
O	900005	System status
M	900006	Sender name
O	900007	Receiver name
O	900008	Sender version
C	900009	ADED national version Condition: Mandatory when this data dictionary is used.
O	900010	Checksum (MODn)
O	900011	Process computer type
C	900012	ADED manufacturer version Condition: mandatory when this data dictionary is used.

A.2 Data elements

ADED-number : 000000
Name : Data dictionary type
Synonyms :
Definition : Identification of the data dictionary type being used in the exchange file.
Comments : This data element is part of ADIS. It is the first data element in the header of an ADIS file.
Format : type: AN length: 8 resolution: 0 unity:
Values : code set: Y min: max:
Code set : DD:
Data dictionary with numbers of 6 positions numeric. In a file every DD-number starts with two zeros.
ID:
Data dictionary with identifiers with 8 positions hexadecimal. It is used in mobile electronic equipment together with the CAN-bus.

ADED-number : 900002
Name : ADED ISO Version
Synonyms :
Definition : The identification of a version within a series of versions of the ISO ADED.
Comments : This is used to differentiate between versions of a dictionary to ensure that the intended interpretation is correct and precise. The version number is the year (CCYY) of publication as an ISO standard.
Format : type: AN length: 8 resolution: 0 unity:
Values : code set: N min: max:

ADED-number : 900003
Name : File Created or updated date
Synonyms :
Definition : Date that the file is being created or updated.
Comments :
Format : type: N length: 8 resolution: 0 unity: ccyymmdd
Values : code set: N min: max:

ADED-number : 900004
Name : File Created or updated time
Synonyms :
Definition : Time that the file is being created or updated.
Comments :
Format : type: N length: 6 resolution: 0 unity: hhmmss
Values : code set: N min: max:

ADED-number : 900005
Name : System status
Synonyms :
Definition : Status that indicates the process computer mode.
Comments :
Format : type: AN length: 1 resolution: 0 unity:
Values : code set: Y min: max:
Code set : 0 = Good = NoError = <ACK>
Z = General not good = <NAK>

ADED-number : 900006
Name : Sender name
Synonyms :
Definition : Name of the software that creates and sends the file.
Comments : E.g. software of feeding computer, software of milk meters, management program.
Format : type: AN length: 24 resolution: 0 unity:
Values : code set: N min: max:

ADED-number : 900007
Name : Receiver name
Synonyms :
Definition : Name of the addressed software.
Comments :
Format : type: AN length: 24 resolution: 0 unity:
Values : code set: N min: max:

ADED-number : 900008
Name : Sender version
Synonyms :
Definition : Version of the software that sends the file.
Comments :
Format : type: AN length: 8 resolution: 0 unity:
Values : code set: N min: max:

ADED-number : 900009
Name : ADED national version
Synonyms :
Definition : The identification of a version within a series of versions of the national ADED.
Comments : This is used to differentiate between versions of a dictionary to ensure that the intended interpretation is correct and precise.
Format : type: AN length: 8 resolution: 0 unity:
Values : code set: N min: max:

ADED-number : 900010
Name : Checksum (MODn)
Synonyms :
Definition : The result of the modulo-n checksum calculation. Each character before the checksum on the V-line is included in the calculation of the checksum. If the checksum is placed at position y, then: Checksum =
(Σ(x=1..y-1) ASC(character at position x)) MOD n
Comments : Every V-line may contain a checksum. The position of a checksum in a V-line depends entirely upon the position of the ADED-number for checksum in the corresponding D-line.
Format : type: N length: 1 resolution: 0 unity:
Values : code set: N min: max:

ADED-number : 900011
Name : Process computer type
Synonyms :
Definition : Short description of the type of process computer.
Comments : E.g. feeding computer, milk meters.
Format : type: A length: 10 resolution: 0 unity:
Values : code set: N min: max:

ADED-number : 900012
Name : ADED manufacturer version
Synonyms :
Definition : The identification of a version within a series of versions of the manufacturer specific ADED.
Comments : This is used to differentiate between versions of a dictionary to ensure that the intended interpretation is correct and precise.
Format : type: AN length: 8 resolution: 0 unity:
Values : code set: N min: max: