

Farm Data Standards

Land Application Data Standard

Version 1.1

CC



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1 Document Management

1.1 *Referenced Documents*

Wolfert, S and Allen, J. Farming for the future: Towards better information-based decision-making and communication. 2011. A Report for the Centre of Excellence in Farm Business Management pp 27.

[EPSG Geodetic Parameter Registry](#)

Crop Data Dictionary Review, Armin Werner and Simon Woodward, Lincoln Agritech Ltd, Dec 2013, p 22

INSPIRE Feature Concept Register - <http://inspire.ec.europa.eu/featureconcept>

INSPIRE Data Specification on Administrative Units – Technical Guidelines
<https://inspire.ec.europa.eu/id/document/tg/au>

International System of Units - https://en.wikipedia.org/wiki/International_System_of_Units

1.2 *Related Documents*

Related standards documents on the [Farm Data Standards website](#) include:

- [Animal data standard](#)
- [Stock Reconciliation data standard](#)
- [Pasture, Graze & Feed data standard](#)
- [Irrigation & Effluent data standard](#)

1.3 *Latest Revisions*

The users of this standard should ensure that their copies of the above-mentioned documents are the latest revisions. The latest version of this Standard will always be published at www.farmdatastandards.org.nz.

1.4 *Version History*

Date	Changes Made	Version #	Authors
24 August 2018	Update Referenced Documents section 1.1 Inclusion of Version History 1.4 Update measurement units for area to include m ²	1.1	Don Wilson, Kim Saunders, Sailee Patel
7 December 2016	Replacement of Spatial Representations section with Spatial Attributes section 3.2 Update of Spread Representations Section A.3	1.0.1	Don Wilson, Kim Saunders, Harry Tucker
13 January 2015	Published version	1.0	Don Wilson, Kim Saunders, Harry Tucker

1.5 *Review of Standards*

Suggestions for improvement of this document will be welcomed. Submit your comments using the feedback mechanisms at www.farmdatastandards.org.nz.



2 Introduction

2.1 Overview

Pastoral farming is becoming a data rich activity. Most biophysical processes from soil nutrient management to cow performance have both paper based and more organised data bases recording status, productivity and intentions. There are a significant number of tools covering livestock, nutrition and financial management¹. Most of these require the user to re-enter data from other sources and they overlap in functionality. It is probable that if data had been more accessible their design would have better focussed on the service they undertook to provide. Farmers will benefit from a highly innovative technology sector that delivers applications that are simple to use and access, which source the information they need without impedance and deliver value.

This document is part of a work stream focusing on Data Standards for interchanging land information for agriculture. Work on this project commenced in early 2013, funded by DairyNZ and with contributions from FarmIQ Systems and Rezare Systems.

2.1 Outcome Statement

Broad adoption of a common vocabulary and data dictionary for exchange of farm information will result in farmers and other industry parties entering data only once and having that data readily accessible for populating multiple decision –making systems. As a result, industry and individual farm businesses will be better placed to undertake systems analysis to inform management practice. More accurate and structured interchange of farm data will also support industry breeding objectives and other information system targets.

2.2 Scope and Application

This standard addresses the data required for both the planned and the actual applications of fertiliser, herbicide and pesticide.

The information specified includes:

- the customer order
- the area spread

¹ Wolfert, S and Allen, J. Farming for the future: Towards better information-based decision-making and communication. 2011. A Report for the Centre of Excellence in Farm Business Management pp 27.

- product details including nutrient information
- spatial representation of the spread and spray tracks and of any ecological hot-spots.

Adoption of this standard will provide compatibility between spreading control equipment and fertiliser company databases.

2.3 Interpretation

For the purposes of this standard, the word ‘shall’ refers to requirements that are essential for compliance with the standard, while the word ‘should’ refers to practices that are advised or recommended.

The terms ‘Normative’ and ‘Informative’ have been used in this standard to define the application of the Appendix to which they apply. A ‘Normative’ Appendix is an integral part of a standard while an ‘Informative’ Appendix is only for information and guidance.

2.4 Definitions and Abbreviations

For the purposes of this standard, the following definitions shall apply:

Term	Definition
GPS	Global Positioning System
SKU	Stock keeping unit
URI	Uniform Resource Identifier
URL	Uniform Resource Locator

3 Components of an Observation

For the purpose of this Standard, an observation is the act or instance of viewing or noting a fact or occurrence for some scientific or other special purpose. Thus an observation can include a note or record of an activity carried out, an event that has occurred, or a measurement taken.

The Open Geospatial Consortium describes observations² as involving “sampling of an ultimate feature of interest”.

The **subject** of the observations In the Land Application Data Standard is a geographic feature. The geographic feature may be identified by a farm identifier and a block or paddock identifier or by a spatial representation (such a polygon or polyline).

² OGC: Observations and Measurements – www.opengeospatial.org/standards/om



Observations will also have other principle components, particularly an **observation date** (and optionally) time of observation (or planned activity), and **reference identifications** within source or destination systems (typically order numbers or job numbers).

3.1 *Location Identification*

A farm SHALL be defined as a location. The Animal Data Standard³ discusses in section 3.1 the identification of locations or farms. It specifies a number of identifiers that are accepted for property identification in New Zealand and supports the interchange of data using all of these mechanisms. This Land Application Data Standard adopts the same location identification.

A number of identifiers are accepted for property identification in New Zealand:

- Ministry of Primary Industry FarmsOnLine identifier;
- NAIT Location identifier (one or more FarmsOnLine identifiers registered with NAIT)
- AgriBase⁴ farm_id (based on a coordinate pair in lat/long, NZTM or NZMG coordinates)
- EPCglobal Serialised Global Location Number⁵ (as used by the NZ Business Number system); and
- Herd Testing Location identifier using the NZMS1 (1939 to 1975) map grid reference.

For historic reasons it will be necessary to support the interchange of data utilising all of these mechanisms. This standard therefore requires that location identifiers shall be prefixed with a URN namespace identifier. Acceptable URN namespaces for use in New Zealand location identifiers shall be:

- urn:epc:id:sgln or
- a nzl:pri: registered location namespace.

For specific interchanges agreed between parties, the parties may agree to exchange identifiers within a single namespace only, and dispense with the namespace prefix.

³ Animal Data Standard (<http://www.farmdatastandards.org.nz/animal-data/>)

⁴ AgriBase, AsureQuality (<https://secure.asurequality.com/capturing-information-technology-across-the-supply-chain/agribase-database-for-new-zealand-rural-properties.cfm>)

⁵ EPCglobal SGLN and GLN are defined at <http://www.gs1.org/gdsn/standards>

3.2 Spatial Attributes

GPS guidance systems are commonly used for the management of spreading either in a vehicle or an aircraft to provide benefits such as accuracy, even spread of the product, reduced distance travelled, traceability and audit requirements, a means for billing the customer, identification of ecological hot-spots. GPS farm maps may be imported into the guidance system.

Appendix A.3 provides for the capture of spread and spray tracks, or for providing guidance of planned application areas and hot-spot areas to be avoided or protected. A variety of formats are allowed for the spatial representation.

Features with location attributes can be described by a set of geographic information. **When transferring data about spatial features, the following Geographic Coordinates, Geographic Shape, and Feature Identifier SHOULD be interchanged with that data. Geographic coordinates and shape are applicable for each location feature so will not be replicated throughout the document.**

Attributes or Fields	Data Types and Notes
Geographic Coordinates	Coordinates representing a location, using latitude and longitude, or a recognised coordinate system identified using the European Petroleum Survey Group (EPSG) parameter registry guide .
Geographic Shape	OGC Web Feature Service URL or string of embedded feature, using a recognised coordinate system identified using the European Petroleum Survey Group (EPSG) parameter registry guide .
Feature Identifier	String: Identifier used to identify the feature
Feature Name	String: Name used to identify the feature
validFrom	ISO Date : Date at which this spatial data object begins
validThrough	ISO Date: Date at which this spatial data object ends

4 Components of Land Application Data Interchange

This standard addresses interchanges of data related to:

1. Details supporting planning and ordering the application, or reporting on a completed application;
2. Details of the products (to be) applied; and
3. Spatial representations of the geographic features affected by the application.



4.1 *Application Information*

Appendix A.1 defines details of the order for an application of fertiliser, herbicide or pesticide and details about the spreading of the application.

The order information identifies the customer and the planned and actual dates of the application.

The spreading information may identify the operator and the equipment used; information about the area spread and the distance covered while spreading; and the application rate.

4.2 *Product Information*

One spreading job SHALL have one or more associated products. A product MAY be a mix or a standard stock-keeping unit (SKU).

Appendix A.2 defines each of the products planned or used, its application rate, the total quantity applied and the percentage of the product in the mix.

For fertiliser products, the nutrient concentrations MAY be defined.

Appendix A Land Applications Data Dictionary (Normative)

A.1 Application Information

The following table defines items categorised as **Application information**. These attributes relate to an application that has been created.

Category	Attributes	Data Types and Notes
Order or Job Details	Application ID	String: identifies the application or job being processed (within system or interchange scope)
	Application Name	String: name of the application
	Block Name	String: name of the block the application is to be applied to
	Order Date	ISO 8601 date
	Customer Name	String: The name of the customer the application is being processed for
	Planned Start Date	ISO 8601 date and time: planned start date of execution of the job
	Planned Completion Date	ISO 8601 date and time: planned completion date of execution of the job
	Date Started	ISO 8601 date and time: actual date the job was started
	Date Completed	ISO 8601 date and time: actual date the job was completed
Spreading Information	Area Requested	Float: total area for which application is to be applied to; in m ² (SI unit) or hectares (ha, accepted non-SI unit). Implementations must clearly specify which unit is used, and ensure consistent use. For spatial data interchange m ² should be used. ⁶
	Area Nominal	Float: area exposed to the application in m ² (SI unit) or hectares (ha, accepted non-SI unit). Implementations must clearly specify which unit is used, and ensure consistent use. For spatial data interchange m ² should be used. ⁶

⁶ See section 6.1.3 at <https://inspire.ec.europa.eu/id/document/tg/au>

Category	Attributes	Data Types and Notes
	Area Spread	Area Spread Floating: actual area applied in m ² (SI unit) or hectares (ha, accepted non-SI unit). Implementations must clearly specify which unit is used, and ensure consistent use. For spatial data interchange m ² should be used. ⁷
	Distance Working	Integer: total distance that was covered while spreading; metres
	Distance Not Working	Floating: distance that was captured when the vehicle was not spreading (e.g. access track to paddock); metres
	Buffer to neighbouring areas	Float: distances to neighbouring paddocks or ecosystems that have to be respected as sensitive or no-go areas; metres
	Operator ID	String: identifier to represent the operator (defined within system or interchange scope)
	Operator Name	String: operator planned to complete the job
	Equipment ID	String: identifies the equipment planned or used to complete the job (defined within system or interchange scope)
	Equipment Name	String: description of the equipment planned or used
	Rate Method	Enumeration: fixed rate, variable rate
	Application Rate	Float: effective application rate in [Units] per hectare (e.g. kg/ha); kg or litres per hectare
	Dressing Name	String: name of the dressing (a single application may contain multiple dressings)

A.2 Product Information

The following table defines items categorised as **product information**. One job may have multiple products (i.e., a mix) or a single product (which may itself be a mix or a normal stock unit).

⁷ See section 6.1.3 at <https://inspire.ec.europa.eu/id/document/tg/au>

Category	Attributes	Data Types and Notes
Product Details	Product Category	Enumeration: <i>see Appendix B.1</i>
	Product Code	String: An identifier for the product (within the application scope), for example an inventory stock keeping unit (SKU)
	Product Name	String: A display or common name of the product
	Application Rate Units	Enumeration: (per hectare); kg, litres, pounds
	Spread Rate	Float: [Application Rate Units] per hectare
	Total quantity	Float: total quantity of product that is planned to be applied; [Units]
	Mix %	Float: % of the product in the mix for the job; %
Nutrient Concentrations	Nutrient	Enumeration: standardised short name of a nutrient; <i>see Appendix B.2</i>
	Concentration	Float: concentration within the product as spread; %

A.3 Spread Representations

The following table defines items categorised as **spread representations**, which are used to define spatial representations of features. A job SHALL have at least one spatial representation, which MAY utilise one or more formats, and MAY be included with the other job data or referenced as a separate internet resource, and MAY represent one of several job features. See [Section 3.2](#) for accepted Spatial Attributes.

Category	Attributes	Data Types and Notes
Spread Representation	Data Format	Enumeration: format of the data; e.g. KML, SHP, KMZ, WKT
	URL	URI string: Online URL to access this data or relative reference to a file attachment included with the job message
	Zone Category	Enumeration: soil quality, yield potential
	Number of Zones	Integer
	Representation ID	String: Optional identifier for this spatial representation of an ecological hot-spot
	Hot-spot Type	Enumeration: Plant, Insect, Fish, Bird
	Number of Hot-spots	Integer

Category	Attributes	Data Types and Notes
Ecological Hot-spot Representation	Hot-Spot Size	Floating: area of the hotspot identified in m ² (SI unit) or hectares (ha, accepted non-SI unit). Implementations must clearly specify which unit is used, and ensure consistent use. For spatial data interchange m ² should be used. ⁸

The following table defines items we have categorised as **feature attributes**. These MAY be associated with features within a spatial representation (for example: feature attributes in a KML file, or columns in the DBF file that accompanies an ESRI Shape file).

Category	Attributes	Data Types and Notes
Feature attributes	Vehicle Speed	Float: metres per second
	Release Rate	Float: product release rate; kg or litres per second
	Spread Width	Float: width of the boom or throw distance; metres
	Application Rate	Float: effective application rate at this feature in [Units] per hectare; kg or litres per hectare

⁸ See section 6.1.3 at <https://inspire.ec.europa.eu/id/document/tg/au>

Appendix B Lists of Valid Values

B.1 Product Category

Product Category is used in the **Product Details** component.

Valid values for **Product Category** are:

Urea
Superphosphate
Other Solid Fertiliser
Other Liquid Fertiliser
Growth Regulator
Nitrate Inhibitor Organic
Herbicide
Pesticide
Other

B.2 Nutrients

Nutrient is used in the **Nutrient Concentrations**.

Valid values for **Nutrient** are:

N	Nitrogen
P	Phosphate
K	Potassium
S	Sulphur
Ca	Calcium
Mg	Magnesium
Mn	Manganese
Na	Sodium

Co	Cobalt
Se	Selenium
Cu	Copper
I	Iodine
Fe	Iron
Mo	Molybdenum
Zn	Zinc
B	Boron
Al	Aluminium
Cd	Cadmium
F	Fluorine

B.3 Feature Type

Geometry Type is used in the **Spread Representation** component.

Valid values for **Feature Type** are:

Working vehicle track
Non-working vehicle track
Boom coverages
Spreading track
Total application polygons
Planned application polygon

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