SA TS ISO 15143.4:2025
ISO/TS 15143-4:2025

Technical Specification

Earth-moving machinery and mobile road construction machinery — Worksite data exchange

Part 4: Worksite topographical data



SA TS ISO 15143.4:2025

This Australian Technical Specification was prepared by ME-063, Earthmoving Equipment. It was approved on behalf of Standards Australia's Standards Development and Accreditation Committee on 22 August 2025.

This Technical Specification was published on 5 September 2025.

The following are represented on Committee ME-063:

- Australasian Institute of Mining & Metallurgy
- Australian Industry Group
- Construction and Mining Equipment Industry Group
- Department of Primary Industries and Regional Development
- Engineers Australia
- Institute of Instrumentation, Control & Automation Australia
- Minerals Council of Australia
- Mining Electrical and Mining Mechanical Engineering Society
- Resources Safety & Health Queensland
- SafeWork NSW
- The University of Queensland
- Victorian WorkCover Authority (WorkSafe Victoria)

This Technical Specification was issued for comment as DR SA TS ISO 15143.4:2025

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals and new products by visiting:

www.standards.org.au

ISBN: 978 1 76175 354 1

SA TS ISO 15143.4:2025
ISO/TS 15143-4:2025

Technical Specification

Earth-moving machinery and mobile road construction machinery — Worksite data exchange

Part 4: Worksite topographical data

First published as SA TS ISO 15143.4:2025.

© ISO 2025 — All rights reserved
© Standards Australia Limited 2025

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth).

How to read this Technical Specification

This page explains the meaning of the language and structure of this Technical Specification.

Refer to Standards Australia's Standardisation Guide 006 for more details about drafting rules.

Australian and Australian/New Zealand publications including Standards are voluntary unless they are referenced in legislation or called up in contracts.

Requirements

To conform to a Technical Specification, all requirements in the Technical Specification need to be met.

A requirement is any statement in the Technical Specification which uses the word "shall".

Recommendations, permissions and possibilities

The following words are commonly used in Standards and related publications, but statements using them do not have to be followed to conform to this Technical Specification:

(a) "should" means that something is recommended.

(b) "may" means that something is permitted.

(c) "can" means that something is possible.

Structure of Technical Specifications

A Technical Specification always has the following parts:

(i) The Preface states who developed the Technical Specification, what the Technical Specification is aiming to do, and how it relates to other documents.

(ii) The Scope states what the Technical Specification is about, what it covers and what it does not cover.

(iii) The Normative references clause lists other documents that are referenced in the Technical Specification as part of requirements.

(iv) The Terms and definitions clause defines important terms to help with understanding the Technical Specification.

A Technical Specification may also include other parts, such as the following:

(1) A normative appendix sets additional requirements that need to be conformed to.

(2) An informative appendix provides additional information or guidance. They usually do not contain requirements. If an informative appendix does contain requirements, the Technical Specification will explain when those requirements apply.

(3) A Bibliography lists documents referenced in the Technical Specification but not as part of requirements.

Many Technical Specifications include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

Preface

This Technical Specification was prepared by the Standards Australia Committee ME-063, Earthmoving Equipment.

The objective of this document is to specify requirements for data exchange at the interface between earth-moving machinery, as defined in AS ISO 6165:2023, mobile road construction machinery, as defined in ISO 22242, and the worksite information systems. It focuses on data for management of a worksite and the assets specific to that worksite.

This document includes:

a) methods of local position correction and localization, including standardization of RTK corrections;

b) method of implementation of a common design model;

c) types of data and methods of data exchange between servers. This includes application programming interfaces (APIs) to exchange data between servers regardless of vendor. These APIs focus on project data, as-built data, and production data. Field-equipment-to-server and machine-to-machine are not included.

This document covers both hardware mounted on earth-moving equipment and field measurement equipment.

This document is identical to, and has been reproduced from, ISO/TS 15143-4:2025, *Earth-moving machinery and mobile road construction machinery — Worksite data exchange — Part 4: Worksite topographical data.*

As this document has been reproduced from an international document, a comma is to be read as a full point when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

© Standards Australia Limited 2025

Contents

Page

Preface ..... **v**
Foreword ..... **viii**
Introduction ..... **ix**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **2**
3.1 General terms relating to construction worksites and technology 2
3.2 Terms specific to field positioning 4
3.3 Terms specific to data exchange 6
3.4 Terms specific to codelist 7
4 System overview **8**
4.1 Service roles 8
4.2 Project data 9
4.3 Design model exchange format 10
4.4 Common localization 10
4.5 Units and formatting 10
4.6 As-built and production data exchange 10
4.7 Concept diagram 10
5 Method of data exchange between servers **11**
5.1 General 11
5.2 API URL 12
5.3 Discovering worksites 12
5.4 Reporting unexpected errors 12
5.5 Authorizing worksite data exchange 12
5.6 Versioning 12
6 Method of project data exchange **12**
6.1 General 12
6.2 Obtaining project data 13
6.3 Contributing project data 13
7 Method of as-built and production data exchange **13**
7.1 General 13
7.2 System-of-record data stream 14
7.3 Real-time data stream 14
8 Method of design model data exchange **14**
8.1 Design file format 14
8.2 Background drawings 15
8.3 Codelist 15
9 Method of local position correction and localization **15**
9.1 General 15
9.2 RTK GNSS position correction 15
9.3 Localization 15
Annex A (normative) **Authorization mechanisms for worksite data exchange** **17**
Annex B (normative) **Worksite directory SMS API** **22**
Annex C (informative) **Server to server use cases** **28**
Annex D (normative) **Shared data types** **30**
Annex E (normative) **Project data types** **34**
Annex F (normative) **Project data SMS API** **52**
Annex G (normative) **As-built and production system-of-record types** **82**

© Standards Australia Limited 2025

Annex H (normative) **As-built and production real-time types** **91**
Annex I (normative) **As-built and production data system-of-record SMS API** **108**
Annex J (normative) **As-built and production data real-time SMS API** **112**
Annex K (normative) **Localization** **115**
Annex L (normative) **ISO LandXML** **119**
Annex M (informative) **Codelist** **174**
Annex N (normative) **Maintenance agency** **176**
Bibliography **179**

© Standards Australia Limited 2025

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 03, *Machine characteristics, electrical and electronic systems, operation and maintenance.*

A list of all parts in the ISO 15143 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

© Standards Australia Limited 2025

Introduction

This document is the fourth part in a series of documents covering data communication involving earth-moving machinery, as defined in ISO 6165, on construction worksites.

ISO 15143-1 defines the architecture of a worksite information system used to transfer information from the earth-moving machinery (EMM) to various users via the worksite information system.

ISO 15143-2 defines the individual data elements in a data dictionary.

This document is intended to be used in conjunction with ISO 15143-1 and ISO 15143-2.

ISO/TS 15143-3 defines a set of data elements common to the status and health of EMM that is collected by multiple OEMs or third-party telematics suppliers and distributed over the internet to application software used to manage machine operation.

ISO/TS 15143-3 focuses on data for management of a fleet of machines, independent of worksite, while this document focuses on data for management of a worksite and the assets specific to that worksite.

Construction worksites vary greatly in size, tasks, complexity, and scope of work. Some worksites have more design models, stakeholders, tasks and local regulations than others. In addition, most worksites have different construction contractor companies involved in various phases of the construction process. Each company can use different technologies for executing tasks. Grade control is a common technology used for earth moving to enhance operator productivity by augmenting control of a machine's working tool using a 3D design model of the worksite. The main high-level elements of a grade control solution are on-machine hardware, local job correction, field measurement equipment, design models, and offboard software tools. This document takes into account the current state of the art in machine guidance technology (grade control, compaction, etc.).

Stakeholders on the worksite must be able to interact effectively in order to complete a construction project as efficiently as possible. ISO 15143-1 defines protocols enabling different vendors of various grade control systems to efficiently interoperate on the same worksite. This document defines specifications relating to solutions both on and off the worksite.

This document focuses on the earth-moving phase of a construction worksite. Earth-moving activities are needed for many applications, such as water runoff management, stripping and reclamation, sanitary landfills, worksite development and roadbuilding.

Conformance to this document means that the relevant solutions have the specified capabilities. However, this document does not imply designing solutions that require the end-users to use these features. Since there are so many variations in job sites, tasks, and business relationships between stakeholders on a project, possibly not all of the capabilities provided on specific sites will be used. While it is possible that the end-user will not use all of the capabilities provided, conformance to this document means that the solutions include the required capabilities. Some examples include the following:

— The ability to provide information on RTK data sources to the vendor integration system (VIS) is a required capability of the site management system (SMS); however, the end-user of a particular SMS on a specific site can choose to not provide information on RTK data sources to the VIS on that site.

— A VIS can provide information about asset operators; however, this document does not require the VIS end-user to enter this information.

It is the responsibility of the user of this document to determine the applicability of legal and regulatory requirements prior to use.

Certain nouns in this document are programmatic and key elements of implementation, such as types, enumerations, and URL elements. For clarity, these programmatic nouns are italicized and use a different font from the rest of the document.

© Standards Australia Limited 2025

NOTES