



BSI Standards Publication

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

---

Part 3: Telematics data

## National foreword

This Published Document is the UK implementation of ISO/TS 15143-3:2020. It supersedes PD ISO/TS 15143-3:2016, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/513/1, Earth moving machinery (International).

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2020  
Published by BSI Standards Limited 2020

ISBN 978 0 539 02698 6

ICS 35.240.99; 53.100

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 January 2020.

### Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

---

---

---

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

**Part 3:  
Telematics data**

*Engins de terrassement et machines mobiles de construction de  
routes — Échange de données sur le chantier —*

*Partie 3: Données télématiques*





**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2020

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
<b>Foreword</b> .....	<b>vii</b>
<b>Introduction</b> .....	<b>viii</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>2</b>
<b>3 Terms, definitions and abbreviated terms</b> .....	<b>2</b>
3.1 Terms and definitions.....	2
3.2 Abbreviated terms.....	4
<b>4 Data management and access control</b> .....	<b>5</b>
4.1 Polling period.....	5
4.2 Editing the data elements over time.....	5
4.3 Data element use case.....	6
4.4 Data element cross reference.....	6
4.5 Access authentication.....	6
<b>5 Response formats</b> .....	<b>6</b>
<b>6 XML declaration links to definition segments</b> .....	<b>7</b>
<b>7 Paging</b> .....	<b>7</b>
<b>8 Discoverability</b> .....	<b>7</b>
8.1 General.....	7
8.2 Snapshot endpoint.....	7
8.2.1 General.....	7
8.2.2 Fleet snapshot.....	7
8.2.3 Single-element snapshot.....	8
8.3 Time series endpoint.....	9
8.4 Links.....	10
8.4.1 General.....	10
8.4.2 Reference attribute (ref).....	10
8.4.3 Hypermedia reference URL (href).....	11
<b>9 Date and time formats</b> .....	<b>11</b>
<b>10 Data fields summary</b> .....	<b>11</b>
<b>11 Data field descriptions</b> .....	<b>13</b>
11.1 General.....	13
11.2 Machine reader information.....	14
11.2.1 General.....	14
11.2.2 Automatics unit installation date.....	14
11.2.3 Equipment make.....	14
11.2.4 Equipment model.....	14
11.2.5 Equipment ID.....	15
11.2.6 Serial number.....	15
11.2.7 OEM ISO identifier (PIN or VIN).....	15
11.3 Last known location.....	15
11.3.1 General.....	15
11.3.2 Date and time of location.....	15
11.3.3 Latitude of location.....	15
11.3.4 Longitude of location.....	15
11.3.5 Altitude of location.....	16
11.3.6 Unit of measure of altitude.....	16
11.3.7 Location time series endpoint (request).....	16
11.3.8 Location response schema (response).....	16
11.4 Operating hours.....	17
11.4.1 General.....	17

11.4.2	Date and time of operating hours .....	17
11.4.3	Operating hours .....	17
11.4.4	Operating hours endpoint (request) .....	17
11.4.5	Operating hours schema (response) .....	17
11.5	Cumulative fuel used (preferred) .....	18
11.5.1	General .....	18
11.5.2	Date and time of cumulative fuel used .....	18
11.5.3	Unit of measure of fuel used to date .....	18
11.5.4	Amount of fuel used to date .....	18
11.5.5	Cumulative fuel used endpoint (request) .....	18
11.5.6	Cumulative fuel used schema (response) .....	18
11.6	Fuel used in the preceding 24 hours (alternative, not preferred) .....	19
11.6.1	General .....	19
11.6.2	Date and time of fuel use in the preceding 24 hours .....	19
11.6.3	Unit of measure of fuel used in the preceding 24 hours .....	19
11.6.4	Fuel used in the preceding 24 hours .....	19
11.6.5	Fuel used in the preceding 24 hours endpoint (request) .....	19
11.6.6	Fuel used in the preceding 24 hours schema (response) .....	20
11.7	Cumulative distance travelled .....	20
11.7.1	General .....	20
11.7.2	Date and time of distance .....	20
11.7.3	Unit of measure of distance .....	20
11.7.4	Cumulative distance travelled .....	21
11.7.5	Cumulative distance travelled endpoint (request) .....	21
11.7.6	Cumulative distance travelled schema (response) .....	21
11.8	Caution codes referencing number .....	21
11.8.1	General .....	21
11.8.2	Date and time of code .....	21
11.8.3	IEC/ISO symbol reference number identifier .....	22
11.8.4	Code description .....	22
11.8.5	Caution codes referencing number endpoint (request) .....	22
11.8.6	Caution codes referencing number schema (response) .....	22
11.9	Cumulative idle operating hours .....	23
11.9.1	General .....	23
11.9.2	Date and time of cumulative idle operating hours .....	23
11.9.3	Cumulative idle operating hours .....	23
11.9.4	Cumulative idle operating hours endpoint (request) .....	23
11.9.5	Cumulative idle operating hours schema (response) .....	23
11.10	Fuel remaining ratio .....	24
11.10.1	General .....	24
11.10.2	Date and time of percentage of fuel remaining .....	24
11.10.3	Fuel Remaining Ratio .....	24
11.10.4	Unit of measure for fuel tank capacity .....	24
11.10.5	Fuel tank capacity .....	24
11.10.6	Fuel remaining ratio endpoint (request) .....	24
11.10.7	Fuel remaining ratio schema (response) .....	24
11.11	Percent of DEF remaining .....	25
11.11.1	General .....	25
11.11.2	Date and time of percent DEF remaining .....	25
11.11.3	Percent of DEF remaining .....	25
11.11.4	Unit of measure for DEF tank capacity .....	25
11.11.5	DEF tank capacity .....	25
11.11.6	Percent DEF remaining endpoint (request) .....	25
11.11.7	Percent DEF remaining schema (response) .....	26
11.12	Engine condition .....	26
11.12.1	General .....	26
11.12.2	Date and time of engine condition .....	26
11.12.3	Engine number .....	26

11.12.4	Engine condition	27
11.12.5	Engine condition endpoint (request)	27
11.12.6	Engine condition schema (Response)	27
11.13	Digital input state	27
11.13.1	General	27
11.13.2	Date and time of digital input set response	28
11.13.3	Digital input number	28
11.13.4	Digital input state	28
11.13.5	Digital input state endpoint (request)	28
11.13.6	Digital input state schema (Response)	28
11.14	Cumulative power take-off hours	29
11.14.1	General	29
11.14.2	Date and time of cumulative power take-off	29
11.14.3	Cumulative power take-off hours	29
11.14.4	Cumulative power take-off hours endpoint (request)	29
11.14.5	Cumulative power take-off hours schema (response)	29
11.15	Average daily engine load factor	30
11.15.1	General	30
11.15.2	Date and time of average load factor	30
11.15.3	Average load factor for preceding 24 h period	30
11.15.4	Average daily engine load factor endpoint (request)	30
11.15.5	Average daily engine load factor schema (response)	30
11.16	Peak daily speed	31
11.16.1	General	31
11.16.2	Date and time of peak travel speed	31
11.16.3	Units of measure for speed	31
11.16.4	Peak speed for the preceding 24 h	31
11.16.5	Peak daily speed endpoint (request)	31
11.16.6	Peak daily speed schema (response)	31
11.17	Cumulative load count	32
11.17.1	General	32
11.17.2	Date and time of load count	32
11.17.3	Cumulative load count	32
11.17.4	Cumulative load count endpoint (request)	32
11.17.5	Cumulative load count schema (response)	32
11.18	Cumulative payload total	33
11.18.1	General	33
11.18.2	Date and time of cumulative payload	33
11.18.3	Unit of measure for payload	33
11.18.4	Cumulative payload	33
11.18.5	Cumulative payload total endpoint (request)	33
11.18.6	Cumulative payload total schema (response)	34
11.19	Cumulative non-productive regeneration hours	34
11.19.1	General	34
11.19.2	Date and time for cumulative non-productive regeneration hours	34
11.19.3	Cumulative non-productive regeneration hours	34
11.19.4	Cumulative hours in non-productive regeneration endpoint (request)	34
11.19.5	Cumulative hours in non-productive regeneration schema (response)	35
11.20	Cumulative idle non-operating hours	35
11.20.1	General	35
11.20.2	Date and time of cumulative idle non-operating hours	35
11.20.3	Cumulative idle non-operating hours	35
11.20.4	Cumulative idle non-operating hours endpoint (Request)	36
11.20.5	Cumulative idle non-operating hours schema (response)	36
11.21	Data field descriptions for codes unique to each system	36
11.21.1	General	36
11.21.2	Diagnostic trouble code identifier	37
11.21.3	Date and time of code	38

11.21.4	Code severity	38
11.21.5	Code description	38
11.21.6	Unit of measure for ambient air temperature	38
11.21.7	Ambient air temperature at time when code was triggered	38
11.21.8	Description of code source	39
11.21.9	Data field descriptions for codes unique to each system endpoint (request)	39
11.21.10		
	Data field descriptions for codes unique to each system schema (response)	39
<b>12</b>	<b>Data schemas</b>	<b>40</b>
12.1	Common schema	40
12.2	Time series schema	40
<b>13</b>	<b>Syntax errors</b>	<b>40</b>
<b>Annex A</b>	<b>(informative) Relationship between this document and ISO 15143-2</b>	<b>41</b>
<b>Annex B</b>	<b>(informative) Data support and collection</b>	<b>56</b>
<b>Annex C</b>	<b>(informative) Common schema</b>	<b>57</b>
<b>Annex D</b>	<b>(informative) Time series schema</b>	<b>62</b>
<b>Annex E</b>	<b>(normative) Process for adding new data elements to this document</b>	<b>63</b>
<b>Bibliography</b>		<b>68</b>

## 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 documents 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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 3, *Machine characteristics, electrical and electronic systems, operation and maintenance*.

This second edition cancels and replaces the first edition (ISO/TS 15143-3:2016), which has been technically revised.

The main changes compared to the previous edition are as follows:

- addition of [Annex E](#) (normative) that specifies process for adding new data elements to ISO/TS 15143-3;
- editorial improvement of the text.

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

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](http://www.iso.org/members.html).

## Introduction

This document is a data schema for data transmitted directly from the equipment manufacturer or provider to the equipment owner in a standardized format for the use and convenience of equipment owners with mixed fleets of equipment.

It defines a set of web services that provide information about fleets of mobile equipment and their associated telematics data. The information about a fleet is provided as a resource, typically on the Internet, at a known Uniform Resource Location (URL).

Customer application can access these resources by sending HTTPS GET requests to the server at the given location. The server responds with an equipment information document whose vocabulary is defined in this document.

ISO/TC 127/SC 3 wishes to acknowledge the Association of Equipment Manufacturers and the Association of Equipment Management Professionals for their contributions to prior work on this subject.

The goal of this document is to provide direct access by end users to their specific fleet data, and not to enable third parties for data aggregation across end users or other purposes. The use of this document enables each end user or assigned customer application developer to develop applications for purposes deemed appropriate by the end user.

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

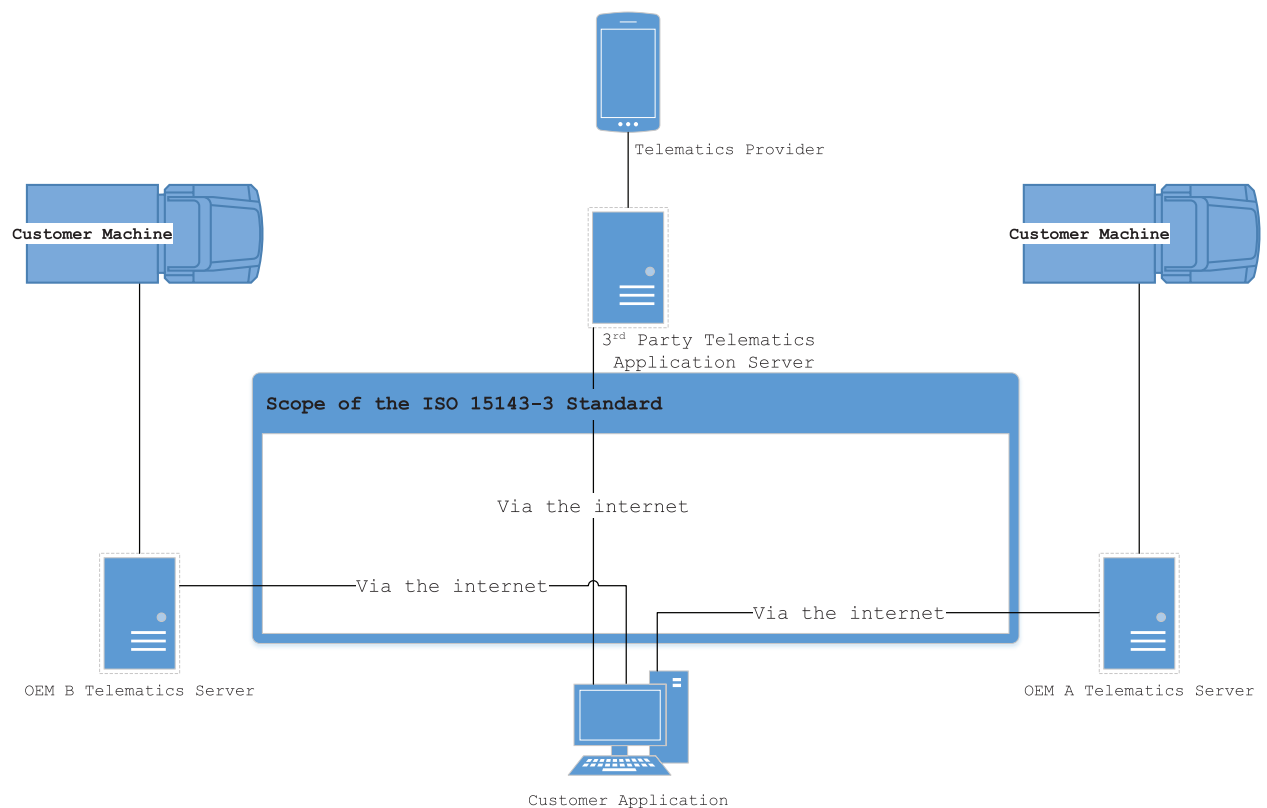
## Part 3: Telematics data

### 1 Scope

This document specifies the communication schema designed to provide mobile machinery status data from a telematics provider's server to customer applications via the Internet. The data is collected from a mobile machine using telematics data-logging equipment and stored on a telematics provider's server. This document describes the communications records used to request data from the server and the responses from the server containing specified data elements to be used in the analysis of machine performance and machine management status related with operation and/or maintenance.

It is applicable to self-propelled earth-moving machinery as defined in ISO 6165 and mobile road construction machinery as defined in ISO 22242 equipped with location and time instrumentation.

It is not applicable to the on-board data collection, on-board communication protocol (e.g. CANbus) or wireless transmission of the mobile machinery data to the telematics provider's server after the data have been collected at the data logger. See [Figure 1](#).



**Figure 1 — Topography of conceptual mixed fleet telematics system within the scope of this document**