
**Intelligent transport systems —
Freight land conveyance content
identification and communication —**

**Part 1:
Context, architecture and referenced
standards**

*Systèmes intelligents de transport — Identification et communication
du contenu des marchandises transportées par voie terrestre —*

Partie 1: Contexte, architecture et normes référencées

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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.

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. www.iso.org/directives

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The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

This first edition of ISO 26683-1 cancels and replaces ISO/TS 26683-1:2012.

ISO 26683 consists of the following parts, under the general title *Intelligent transport systems — Freight land conveyance content identification and communication*:

- *Part 1: Context, architecture and referenced standards*
- *Part 2: Application interface profiles*

The following parts are under preparation:

- *Part 3: Monitoring cargo stress measurement information during road transport* [Technical Specification]
- *Part 4: Security profile*

Introduction

In a scenario of international land transport and logistics, it is often difficult for a consignor and a consignee to know the physical real time location of cargo after consigning the cargo to a transport and logistics service provider. Where a cargo is transferred from one haulier to another, obtaining information of the manifest at a detailed level is often difficult. Auditing the actual content of a consignment en route and monitoring cargo stress measurement information during road transport is also difficult, especially in the case of sealed land conveyances such as sealed intermodal containers. It is a different task to that of progressing order administration from consignor to consignee.

Seamless exchange of accurate, complete, and timely data at transportation hand-offs has always been important for efficiency and accountability. There is now a growing understanding of needs for security of transport information, and for transfer of information related to security against terrorism as well as theft and traditional contraband.

There is no single organization responsible for standards through the intermodal supply chain. To achieve a coherent set of standards requires coordination among the various international organizations working on pieces of these standards.

This part of ISO 26683 specifies the data concepts applicable to the movement of freight and its intermodal transfer. This part of ISO 26683 focuses on a single “thread” of the overall end to end supply chain. These data concepts include information entities (data elements), aggregated/associated information entities (groups of data elements) and messages that comprise information exchanges at transport interfaces along the chain of participants responsible for the delivery of goods from the point of origin through to the end. This work is integrated closely with ‘Universal Business Language’ (UBL) espoused by OASIS and refers to the UN/CEFACT standards (Data Elements TDED, Core Components Technical Specifications and Library CCL).

ISO 17687 provides a consistent context for the presentation and storage of ‘Dangerous Goods’/HAZMAT information. ISO 17687 is designed to support the automated identification, monitoring and exchange of emergency response information regarding dangerous goods carried on board road transport vehicles. However, ISO 17687 does not specify nor even imply that any particular on-board or off-board systems should be capable of performing such monitoring, data retention, or communications. ISO 17687 deals with the on board information but not the media used for transmitting the information, nor the means of collating and transferring the information. ISO 17687 identifies that such communications are beyond its scope.

However, in domestic land transport, particularly where no border crossings are involved, and except in the case of ‘Dangerous Goods’/HAZMAT loads, a trucker usually does not have to report cargo manifest information to any regulator. A trucker receives an order from the client with delivery date/time and location and except in the case of ‘Dangerous Goods’/HAZMAT, may not necessarily be given any detailed cargo information. The haulier may or may not use a wireless tracking system for its vehicles, and such systems may or may not carry any detailed consignment/cargo details. In these situations real time land transport cargo monitoring is not often possible, and in respect to auditing the content of the load and monitoring cargo condition information, even where possible, has limitations.

There are also many situations where the tractor and trailer combination changes during the course of a journey from consignor to consignee.

Further, even where such comprehensive systems are in place, they rely on the level of detail that exists within its controlling computer system, and without the ability to monitor the actual contents, there is no possibility to:

- a) audit the actual contents of the consignment. This is particularly difficult in the case of a sealed intermodal container (ISO 668 and subsequent related international standards for freight containers);
- b) monitor the condition of the contents of the consignment (cargo stress measurement information).

The ISO 26683 series is therefore complementary to the context of ISO/TS 24533 (Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Road transport information exchange methodology) and may well provide sources of data

required by such systems, and an electronic auditing capability has yet to be embraced by ISO/TS 24533. As has been seen above, ISO 17687 does not address the means by which its data are collected. ISO 26683 is complementary to ISO 7372.

Further details concerning the complementary nature of the ISO 26683 series to ISO/TS 24533, EFM, ISO 17687, IEEE 1512.3, UN/CEFACT, particularly UN/CEFACT UMM, ISO 7372, OASIS/UBL can be found in [Clauses 5](#) and [6](#) of this part of ISO 26683.

The ISO 26683 series provides a data agglomeration/aggregation capability as one means to capture and transfer information about the content of the cargo load and its condition to a central system. Therefore the ISO 26683 series can also support both ISO/TS 24533 and ISO 17687/IEEE 1512.3 instantiations. ISO 26683 is designed to present data to end-to-end cargo application systems; it does not provide end to end system (consignor to consignee) system design.

The ISO 26683 series envisages that a combination of existing technologies can be used to agglomerate/aggregate relevant data and use a tractor/truck mounted communications means to realize real time cargo visibility of land transport, and is thus not dependent on future technologies or technologies currently in research and development phases (although it will be suitable for future technical means to deliver its data).

This part of ISO 26683 is the first part of a series of standards which provides context and high level architecture for all parts of the ISO 26683 series.

Part 2 defines application interface profiles to agglomerate/aggregate and transfer land cargo transport data to provide improved land cargo transport data and specifies one or more modes of transfer using available ICT technologies.

Part 3 will specify the handling of on-board cargo stress measurement information during road transport.

Part 4 will provide a security profile requirement and definition.

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Intelligent transport systems — Freight land conveyance content identification and communication —

Part 1: Context, architecture and referenced standards

1 Scope

This part of ISO 26683 provides the context for application interface profiles for the exchange of land transport data using current technologies and existing standards for item identification, package identification, container identification, and international standards and practices regarding freight and its movement.

This part of ISO 26683 provides:

- a) a context of the relationship between the ISO 26683 series and other freight and fleet standards and defines the objectives for the ISO 26683 series. The explanation is provided as to how existing International Standards and Technical Specifications can be utilized to agglomerate/aggregate data concepts by using standardised application interface profiles within the context of ISO 26683 and how ISO 26683 can be used to provide information/data to cargo management systems.
- b) descriptions of use cases of providing information to cargo tracking and tracing in end-to-end transport by exploiting identifiers, data carriers, EDI messages and data elements with respect to various types of cargo and transport means within an international intermodal/multimodal cargo movement context.
- c) an architecture for the collation and transfer of data agglomerated/aggregated from information contained in the transport load to transport operating systems, with the objective being to enable efficient handling of truck/trailer identification and on-board cargo information for tracking, tracing and cargo monitoring purposes in a land cargo transport situation.

NOTE ISO 26683 is designed to present information on end-to-end cargo application systems; it does not provide end to end (consignor to consignee) system design.

This part of ISO 26683 is the first part of a multi-part series which provides context, high level architecture and a list of referenced standards used for all parts of the ISO 26683 series of deliverables.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

In addition to the references listed below, [Annex A](#) identifies a large number of international standards that may be used in the identification, labelling and communication with the contents of a land conveyance. Data may conform to any of the international standards listed below, but shall conform to at least one of the international standards listed below or in [Annex A](#).

ISO 6346, *Freight containers — Coding, identification and marking*

ISO 7372, *Trade data interchange — Trade data elements directory*

ISO 13183, *Intelligent transport systems — Communications access for land mobiles (CALM) — Using broadcast communications*

ISO/TR 14813-2, *Transport information and control systems — Reference model architecture(s) for the TICS sector — Part 2: Core TICS reference architecture*

ISO 17261, *Intelligent transport systems — Automatic vehicle and equipment identification — Intermodal goods transport architecture and terminology*

ISO 17262, *Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures*

ISO 17263, *Intelligent transport systems — Automatic vehicle and equipment identification — System parameters*

ISO 17264, *Intelligent transport systems — Automatic vehicle and equipment identification — Interfaces*

ISO 17687, *Transport Information and Control Systems (TICS) — General fleet management and commercial freight operations — Data dictionary and message sets for electronic identification and monitoring of hazardous materials/dangerous goods transportation*

ISO 21210, *Intelligent transport systems — Communications access for land mobiles (CALM) — IPv6 Networking*

ISO 21212, *Intelligent transport systems — Communications access for land mobiles (CALM) — 2G Cellular systems*

ISO 21213, *Intelligent transport systems — Communications access for land mobiles (CALM) — 3G Cellular systems*

ISO 21214, *Intelligent transport systems — Communications access for land mobiles (CALM) — Infra-red systems*

ISO 21215, *Intelligent transport systems — Communications access for land mobiles (CALM) — M5*

ISO 21216, *Intelligent transport systems — Communication access for land mobiles (CALM) — Millimetre wave air interface*

ISO 21217, *Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*

ISO 21218, *Intelligent transport systems — Communications access for land mobiles (CALM) — Access technology support*

ISO/IEC/IEEE 21451-1, *Information technology — Smart transducer interface for sensors and actuators — Part 1: Network Capable Application Processor (NCAP) information model*

ISO/IEC/IEEE 21451-2, *Information technology — Smart transducer interface for sensors and actuators — Part 2: Transducer to microprocessor communication protocols and Transducer Electronic Data Sheet (TEDS) formats*

ISO/IEC/IEEE 21451-4, *Information technology — Smart transducer interface for sensors and actuators — Part 4: Mixed-mode communication protocols and Transducer Electronic Data Sheet (TEDS) formats*

ISO/IEC/IEEE 21451-7, *Information technology — Smart transducer interface for sensors and actuators — Part 7: Transducer to radio frequency identification (RFID) systems communication protocols and Transducer Electronic Data Sheet (TEDS) formats*

ISO/TS 24533, *Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Road transport information exchange methodology*

ISO 25111, *Intelligent transport systems — Communications access for land mobiles (CALM) — General requirements for using public networks*

ISO 25112, *Intelligent transport systems — Communications access for land mobiles (CALM) — Mobile wireless broadband using IEEE 802.16*

ISO 25113, *Intelligent transport systems — Communications access for land mobiles (CALM) — Mobile wireless broadband using HC-SDMA*

ISO 26683-2, *Intelligent transport systems — Freight land conveyance content identification and communication — Part 2: Application interface profiles*

ISO 29281, *Intelligent transport systems — Communications access for land mobiles (CALM) — Non-IP networking*

ISO 29282, *Intelligent transport systems — Communications access for land mobiles (CALM) — Satellite networks*

ISO 29283, *ITS CALM Mobile Wireless Broadband applications using Communications in accordance with IEEE 802.20*

IEEE 1512.3, *IEEE Standard for Hazardous Material Incident Management Message Sets for Use by Emergency Management Centers*

OASIS Universal Business Language v2.1¹⁾

OASIS UBL Common Library - - transport library

OASIS UBL-CommonAggregateComponents-2.1

CEFACT/TMG/N093, UN/CEFACT Modelling Methodology (UMM)

- UMM Foundation Module V1.0 (2006)
- UMM Base Module V1.0 (2006)
- User Guide UMM 1.0

UN/CEFACT Core Components Library CCL 10B

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

application interface

communication point where one part of a system communicates with another in order to service an application

Note 1 to entry: The communication point is typically but not necessarily wireless in the scenarios of ISO 26683.

3.2

application interface profile

series and sequence of behaviour and protocols including, where appropriate, the identification of chosen classes, conforming subsets, options and parameters of those base standards necessary to accomplish a defined function at an interface in a particular way such that it can be used interoperably between two parties

Note 1 to entry: Profiles, which define conforming subsets or combinations of base profiles identify the use of particular options available in the base standards, and provide a basis for the development of uniform, internationally recognized, interoperability and conformance tests.

3.3

audit

methodical examination/verification/evaluation of the information associated with items in a cargo and other relevant data

1) <http://docs.oasis-open.org/ubl/prd1-UBL-2.1/UBL-2.1.xml>

3.4

authority

statutory body existing within a jurisdiction and a specific area of responsibility that administers legislation to regulate trade and/or monitors compliance with existing legislation

3.5

base standard

approved international standard used as the basis of an application interface or an application interface profile

3.6

cargo

goods or produce transported, generally for commercial gain, by ship, aircraft, train, van or truck

Note 1 to entry: In modern times, containers are used in most intermodal long-haul cargo transport.

3.7

cargo stress measurement information

data collected from sensors associated with an item, container or conveyance that provides information about parameters that may affect the condition of the cargo

EXAMPLE Temperature, position/attitude (upright cargo), pressure, shock, dampness, etc.

3.8

carrier

party undertaking or arranging transport of goods between named points

[UN/TDED 3126: UN/CEFACT definition 1001 code CA]

3.9

consignment

separately identifiable amount of goods items (available to be) transported from one consignor to one consignee via one or more than one modes of transport and specified in one single transport document

3.10

consignee

party to which goods are consigned/shipped

[UN/TDED 3132: UN/CEFACT definition 3035 code CN]

3.11

consignor

shipper, sender, party which, by contract with a carrier, consigns or sends goods with the carrier, or has them conveyed by him

[UN/TDED 3336: UN/CEFACT definition 3035 code CZ]

3.12

consolidation

grouping together of individual consignments of goods into a combined consignment for carriage

3.13

container

receptacle for the transport of goods, especially one readily transferable from one form of transport to another

[UN/TDED 3336: UN/CEFACT definition 8053 code CN Container]

3.14

conveyance

means of transport

3.15**data carrier**

means or function which carries data objects from one point to another point

3.16**electronic freight manifest**

electronic means of generating, storing, distributing, and accessing manifest-related data along the end-to-end supply chain

3.17**forwarder****forwarding agent**

person or company that organizes shipments for individuals or other companies and may also act as a carrier

3.18**freight****goods**

any commodity transported

3.19**freight forwarder**

party arranging the carriage of goods including connected services and/or associated formalities on behalf of a consignor or consignee

[UN/TDED 3336: UN/CEFACT definition 3035 code FW]

3.21**identifier**

unique and unambiguous expression in a written format either by a code, by numbers or by the combination of both to distinguish variations from one to another among a class of substances, items, or objects

3.22**intermodal freight container**

large cargo carrying object (of various formats) used for transport or storage that conforms to ISO 6346 and designed and constructed to permit it to be used interchangeably in two or more modes of transport

3.23**ISO intermodal freight container****ISO intermodal container****ISO container**

large cargo carrying object used for transport or storage that conforms to ISO 668, Series 1 containers

3.24**international standardized profile**

internationally agreed-to, harmonized document which describes one or more profiles

3.25**interoperability**

ability of two or more systems to exchange information and to make mutual use of the information that has been exchanged

Note 1 to entry: Sometimes called “open systems”.

3.26**ITS station**

communication point for ITS system

3.27

land transport

mode of transport that is effected using roads and railways and may in some cases include use of inland waterways

Note 1 to entry: See *transport*.

3.28

land transport conveyance

transport means to effect the land transport sector(s) of a cargo

3.29

manifest

specification of all cargo on board the transportation means (all modes) containing details of contents, shipper, consignee, and other details that may be required by customs or consular authorities

3.30

open system environment

comprehensive set of interfaces, services, and supporting formats, plus user aspects, for interoperability and/or portability of applications, data, or people, as specified by information technology standards and profiles

3.31

rollercage

cage with casters for transporting loose items

3.32

security

protection of information and data against danger, damage, degradation of quality, loss and criminal activity so that unauthorized persons or systems cannot read or modify them and authorized persons or systems are not denied access to them

Note 1 to entry: Security has to be compared to related concepts: Safety, continuity, reliability. The key difference between security and reliability is that security must take into account the actions of people attempting to cause destruction.

3.33

security profile

characterization of security requirements

3.34

shipment

identifiable collection of one or more goods items (available to be) transported together from the original shipper, to the ultimate consignee

Note 1 to entry: A shipment may be transported in one or a multiple number of consignments.

3.35

taxonomy

classification scheme for referencing profiles or sets of profiles unambiguously

3.36

tracing

function of retrieving information concerning goods, goods items, consignments or equipment

3.37

transport

transportation

movement of people and goods from one location to another performed by modes, such as air, rail, road, water, cable, pipeline and space and the field comprises the attributes of infrastructure, vehicles, and operations

3.38

transport means

vehicles, trailers, vessels, aircraft, or combination thereof, used for the transport of goods to perform a journey

3.39

tracking

function of maintaining status information of goods, goods items, consignments or equipment

3.40

trucker

truck driver

person who earns a living as the driver of a truck, usually a semi truck, box truck, or dump truck

Note 1 to entry: Commonly referred to as a trucker or driver in the United States and Canada; a truckie in Australia and New Zealand; a lorry driver or driver in Ireland and the United Kingdom.

3.41

visibility

ability to audit the content of a land conveyance while en-route or at strategic points of an overland journey

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4 Symbols and abbreviated terms

For the purposes of this document, the following symbols and abbreviated terms apply.

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3GPP	3rd generation partnership project
AEI	automatic equipment identification
AVI	automatic vehicle identification
CALM	communication access for land mobiles
CEFACT	See UN/CEFACT
CCL	Core component library
ebXML	electronic Business eXtensible Mark-up Language
EAN	European Article Numbering Association
EDIFACT	electronic data interchange for administration, commerce and transport
EFM	electronic freight management
ERI	electronic registration identification
GSM	global system mobile
HAZMAT	hazardous materials/dangerous goods
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
ITS	intelligent transport systems
JTC1	Joint Technical Committee 1
JWG	joint working group
LTE	(3GPP) long term evolution (sometimes called 4G)
OASIS	Organization for the Advancement of Structured Information Standards
OBE	on-board equipment
OBU	on-board unit
OCR	optical character recognition
PDC	personal digital cellular (Japanese advanced 2G mobile communications standard)
PHS	personal handy-phone system
RFID	radio frequency identification
RSU	road side unit
SOA	service oriented architecture
SOAP	simple object access protocol
SSL	secure sockets layer
TDED	trade data elements directory