

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Engineering data exchange format for use in industrial automation systems
engineering – Automation markup language –
Part 1: Architecture and general requirements**

**Format d'échange de données techniques pour une utilisation dans l'ingénierie
des systèmes d'automatisation industrielle – Automation markup language –
Partie 1: Architecture et exigences générales**



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2018 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 21 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Engineering data exchange format for use in industrial automation systems
engineering – Automation markup language –
Part 1: Architecture and general requirements**

**Format d'échange de données techniques pour une utilisation dans l'ingénierie
des systèmes d'automatisation industrielle – Automation markup language –
Partie 1: Architecture et exigences générales**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 25.040.40; 35.060; 35.240.50

ISBN 978-2-8322-5521-6

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	7
INTRODUCTION.....	9
1 Scope.....	11
2 Normative references	11
3 Terms, definitions and abbreviations	12
3.1 Terms and definitions.....	12
3.2 Abbreviations	14
4 Conformity.....	15
5 AML architecture specification	15
5.1 General.....	15
5.2 General AML architecture	15
5.3 Sub document versions and AML superior document information	16
5.4 Meta information about the AML source tool	17
5.5 AML relations specification	18
5.5.1 General	18
5.5.2 Class-instance-relations	18
5.5.3 Instance-instance-relations	18
5.5.4 Identification of objects.....	20
5.6 AML document reference specification.....	20
5.6.1 General	20
5.6.2 Referencing COLLADA documents	20
5.6.3 Referencing PLCopen XML documents.....	20
5.6.4 Referencing additional documents in the scope of IEC 62714 (all parts)	20
5.6.5 Referencing documents outside of the scope of IEC 62714 (all parts).....	20
5.6.6 Referencing CAEX attributes to items in external documents	21
6 AML base libraries.....	21
6.1 General.....	21
6.2 General provisions	21
6.3 AML interface class library – AutomationMLInterfaceClassLib.....	22
6.3.1 General	22
6.3.2 InterfaceClass AutomationMLBaseInterface.....	24
6.3.3 InterfaceClass Order	24
6.3.4 InterfaceClass Port	25
6.3.5 InterfaceClass PPRConnector	25
6.3.6 InterfaceClass ExternalDataConnector	26
6.3.7 InterfaceClass COLLADAInterface	26
6.3.8 InterfaceClass PLCopenXMLInterface	27
6.3.9 InterfaceClass ExternalDataReference	27
6.3.10 InterfaceClass Communication	27
6.3.11 InterfaceClass SignalInterface	28
6.4 AML basic role class library – AutomationMLBaseRoleClassLib.....	28
6.4.1 General	28
6.4.2 RoleClass AutomationMLBaseRole.....	30
6.4.3 RoleClass Group	31
6.4.4 RoleClass Facet	31
6.4.5 RoleClass Resource	31

6.4.6	RoleClass Product	32
6.4.7	RoleClass Process	32
6.4.8	RoleClass Structure	33
6.4.9	RoleClass ProductStructure	33
6.4.10	RoleClass ProcessStructure	34
6.4.11	RoleClass ResourceStructure	34
6.4.12	RoleClass ExternalData	34
6.5	AML basic attribute type library	35
6.5.1	General	35
6.5.2	Attributes of the AutomationMLBaseAttributeTypeLib	36
7	Modelling of user-defined data	39
7.1	General	39
7.2	User-defined attributes	39
7.3	User-defined AttributeTypes	39
7.4	User-defined InterfaceClasses	40
7.5	User-defined RoleClasses	41
7.6	User-defined SystemUnitClasses	42
7.7	User-defined InstanceHierarchies	43
8	Extended AML concepts	44
8.1	General overview	44
8.2	AML Port interface	44
8.3	AML Facet object	44
8.4	AML Group object	45
8.5	Splitting of AML top-level data into different documents	45
8.6	Internationalization, AML multilingual expression	45
8.7	Version information of AML objects	46
8.8	Modelling of structured attribute lists or arrays	46
8.9	AML Container	46
Annex A (informative)	General introduction into the Automation Markup Language	48
A.1	General Automation Markup Language concepts	48
A.1.1	The Automation Markup Language architecture	48
A.1.2	Modelling of plant topology information	49
A.1.3	Referencing geometry and kinematics information	51
A.1.4	Referencing logic information	51
A.1.5	Referencing documents outside of the scope of IEC 62714	52
A.1.6	Interlinking CAEX attributes and attributes in external documents	53
A.1.7	Modelling of relations	54
A.2	Extended AML concepts and examples	57
A.2.1	General overview	57
A.2.2	AML Port concept	57
A.2.3	AML Facet concept	60
A.2.4	AML Group concept	62
A.2.5	Process-Product-Resource concept	66
A.2.6	AML multilingual expression concept	74
A.2.7	Attribute lists and arrays	75
Annex B (informative)	XML representation of standard AML base libraries	79
Bibliography	81

Figure 1 – Overview of the engineering data exchange format AML	9
Figure 2 – AML document version information	17
Figure 3 – XML text of the AML source tool information	17
Figure 4 – Example of a relation as block diagram and as object tree	19
Figure 5 – Example relation between the objects “PLC1” and “Rob1”	19
Figure 6 – XML text of the example relation between the objects “PLC1” and “Rob1”	19
Figure 7 – AML basic interface class library	23
Figure 8 – XML description of the AML basic interface class library	24
Figure 9 – AML basic role class library	29
Figure 10 – AutomationMLBaseRoleClassLib	30
Figure 11 – XML text of the AutomationMLBaseRoleClassLib	30
Figure 12 – AML basic attribute type library	35
Figure 13 – XML text of the AutomationMLBaseAttributeTypeLib	36
Figure 14 – Example of a user-defined attribute	39
Figure 15 – Examples for user-defined AttributeTypes	40
Figure 16 – XML code of the examples for user-defined AttributeTypes	40
Figure 17 – Example of a user-defined InterfaceClass in a user-defined InterfaceClassLib	41
Figure 18 – XML code of the example of a user-defined InterfaceClass in a user- defined InterfaceClassLib	41
Figure 19 – Example of a user-defined RoleClass in a user-defined RoleClassLib	42
Figure 20 – XML code of the example of a user-defined RoleClass in a user-defined RoleClassLib	42
Figure 21 – Examples for different user-defined SystemUnitClasses	42
Figure 22 – XML code of the examples for different user-defined SystemUnitClasses	43
Figure 23 – Example of a user-defined InstanceHierarchy	43
Figure 24 – AML representation of a user-defined InstanceHierarchy	44
Figure A.1 – AML general architecture	48
Figure A.2 – Plant topology with AML	50
Figure A.3 – Reference from CAEX to a COLLADA document	51
Figure A.4 – Reference from a CAEX to a PLCopen XML document	51
Figure A.5 – Example of referencing an external document	52
Figure A.6 – XML text of the example for referencing an external document	52
Figure A.7 – Example of referencing a CAEX attribute to an item in an external document	53
Figure A.8 – XML text of the example for referencing a CAEX attribute to an item in an external document	54
Figure A.9 – Relations in AML	55
Figure A.10 – XML description of the relations example	56
Figure A.11 – XML text of the SystemUnitClassLib of the relations example	56
Figure A.12 – XML text of the InstanceHierarchy of the relations example	57
Figure A.13 – Port concept	58
Figure A.14 – Example describing the AML Port concept	58
Figure A.15 – XML description of the AML Port concept	59
Figure A.16 – XML text describing the AML Port concept	60

Figure A.17 – Definition of a user-defined AML Port class “UserDefinedPort”	60
Figure A.18 – AML Facet example	61
Figure A.19 – XML text of the AML Facet example	62
Figure A.20 – AML Group example	63
Figure A.21 – XML text for the AML Group example	63
Figure A.22 – Combination of the Facet and Group concept	64
Figure A.23 – XML text view for the combined Facet-Group example	65
Figure A.24 – Generic HMI template “B” visualizing a process variable “Y” of a conveyor	66
Figure A.25 – Generated HMI result “B” visualizing both conveyors with individual process variables	66
Figure A.26 – Base elements of the Product-Process-Resource concept	67
Figure A.27 – PPRConnector interface	67
Figure A.28 – Example for the Product-Process-Resource concept	68
Figure A.29 – AML roles required for the Process-Product-Resource concept	68
Figure A.30 – Elements of the example	69
Figure A.31 – Links within the example	69
Figure A.32 – Links of the resource centric view on the example	70
Figure A.33 – InstanceHierarchy of the example in AML	71
Figure A.34 – InternalElements of the example	72
Figure A.35 – InternalLinks of the example	72
Figure A.36 – InstanceHierarchy of the example in XML	73
Figure A.37 – Example describing the AML multilingual expression concept	74
Figure A.38 – XML description of the AML multilingual expression concept	74
Figure A.39 – XML text describing the AML multilingual expression concept	74
Figure A.40 – AML model of a multilingual AttributeType	75
Figure A.41 – XML code of the a multilingual AttributeType	75
Figure A.42 – Attribute list “SupportedFrequencies”	76
Figure A.43 – XML code for the attribute list “SupportedFrequencies”	76
Figure A.44 – Example CAEX model of the array “Edges”	77
Figure A.45 – XML code for the attribute array “Edges”	78
Figure B.1 – XML text of the standard AML interface class library, role class library and attribute type library	80
Table 1 – Abbreviations	15
Table 2 – Interface classes of the AutomationMLInterfaceClassLib	22
Table 3 – InterfaceClass AutomationMLBaseInterface	24
Table 4 – InterfaceClass Order	25
Table 5 – Optional attributes for AML Port interfaces	25
Table 6 – InterfaceClass PPRConnector	26
Table 7 – InterfaceClass ExternalDataConnector	26
Table 8 – InterfaceClass COLLADAInterface	26
Table 9 – InterfaceClass PLCopenXMLInterface	27
Table 10 – InterfaceClass ExternalDataReference	27

Table 11 – InterfaceClass Communication	28
Table 12 – InterfaceClass SignalInterface	28
Table 13 – RoleClass AutomationMLBaseRole	31
Table 14 – RoleClass Group	31
Table 15 – RoleClass Facet	31
Table 16 – RoleClass Resource	32
Table 17 – RoleClass Product	32
Table 18 – RoleClass Process	33
Table 19 – RoleClass Structure	33
Table 20 – RoleClass ProductStructure	33
Table 21 – RoleClass ProcessStructure	34
Table 22 – RoleClass ResourceStructure	34
Table 23 – RoleClass ExternalData	34
Table 24 – Attribute Types of the AutomationMLBaseAttributeTypeLib	36
Table 25 – Sub-attributes of the attribute “Cardinality”	38
Table 26 – Sub-attributes of the attribute “AssociatedValue”	38
Table A.1 – Overview of major extended AML concepts	57

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ENGINEERING DATA EXCHANGE FORMAT FOR USE IN
INDUSTRIAL AUTOMATION SYSTEMS ENGINEERING –
AUTOMATION MARKUP LANGUAGE –****Part 1: Architecture and general requirements**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62714-1 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

This second edition cancels and replaces the first edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) use of CAEX 3.0 according to IEC 62424:2016 which provides technical improvements as attribute libraries, nested interfaces, new fields for indicating the source of an object, a refinement of the mirror concept and native support of multiple roles, native meta information about the CAEX file source tool, identification of instances via unique IDs instead of paths, etc.,

- b) improved modelling of references to documents outside of the scope of the present standard,
- c) modelling of references between CAEX attributes and items in external documents, e.g. within an Excel sheet,
- d) revised role libraries,
- e) modified Port concept,
- f) modelling of multilingual expressions,
- g) modelling of structured attribute lists or array,
- h) a new AML container format,
- i) a new standard AML attribute library.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
65E/582/FDIS	65E/586/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62714 series, published under the general title *Engineering data exchange format for use in industrial automation systems engineering – Automation markup language*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

IEC 62714 is a solution for data exchange focusing on the domain of automation engineering.

The data exchange format defined in the IEC 62714 series (Automation Markup Language, AML) is an XML schema based data format for plant engineering data. AML has been developed in order to support the data exchange in a heterogeneous engineering tools landscape. The goal of AML is to interconnect engineering tools in their different disciplines, e.g. mechanical plant engineering, electrical design, process engineering, process control engineering, HMI development, PLC programming, robot programming, etc. The application of IEC 62714 is industry independent. It is applicable in all industries that require data exchange in their engineering tool chain, e.g. in discrete industry or process industry.

AML stores engineering information following the object-oriented paradigm and allows modelling of physical and logical plant components as data objects encapsulating different aspects. An object may consist of other sub-objects, and can itself be part of a larger composition or aggregation. Typical objects in plant automation comprise information on topology, geometry, kinematics and logic, whereas logic comprises sequencing, behaviour and control. Therefore, an important focus in the data exchange in engineering is the exchange of object oriented data structures, geometry, kinematics and logic.

AML combines existing industry data formats that are designed for the storage and exchange of different aspects of engineering information. These data formats are used on an “as-is” basis within their own specifications and are not branched for AML needs.

The core of AML is the top-level data format CAEX. CAEX is utilized to interconnect the different data formats. Therefore, AML has an inherent distributed document architecture.

Figure 1 illustrates the basic AML architecture and the distribution of topology, geometry, kinematics and logic information.

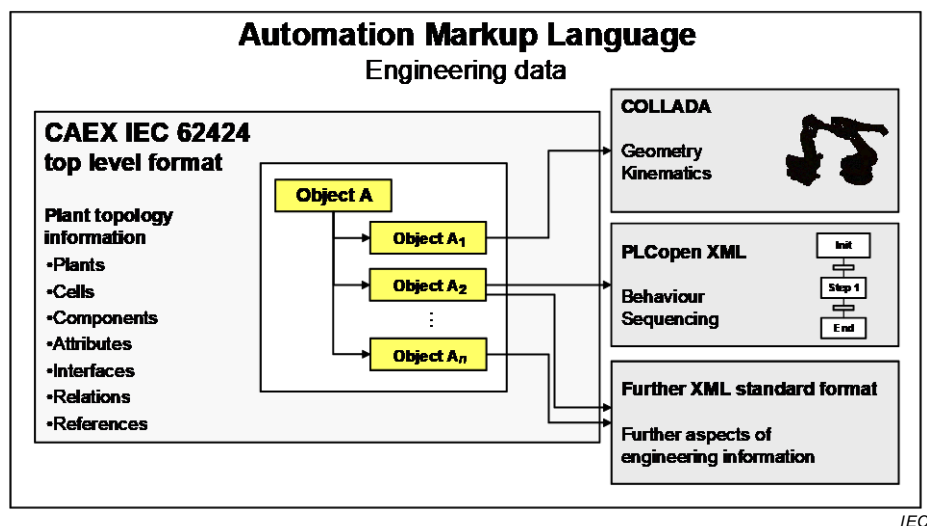


Figure 1 – Overview of the engineering data exchange format AML

Due to the different aspects of AML, the IEC 62714 series consists of different parts focusing on different aspects:

- IEC 62714-1: Architecture and general requirements

This part specifies the general AML architecture, the modelling of engineering data, classes, instances, relations, references, hierarchies, basic AML libraries and extended AML concepts. It is the basis of all future parts, and it provides mechanisms to reference other subformats.

- IEC 62714-2: Role class libraries
This part specifies additional AML libraries.
- IEC 62714-3: Geometry and kinematics
This part specifies the modelling of geometry and kinematics information.
- IEC 62714-4¹: Logic
This part specifies the modelling of logics, sequencing, behaviour and control related information.

Further parts will be added in the future in order to interconnect further data standards to AML.

As long as no further parts describe the integration of further standards, it is important to focus on a limited set of sub data formats. Otherwise, it would open up the usage of any data format and data exchange would not work.

Clause 1 defines the scope for IEC 62714.

Clause 2 provides normative references.

Clause 3 provides terms, definitions and abbreviations.

Clause 4 defines the conformity to IEC 62714.

Clause 5 describes general architecture specifications for IEC 62714.

Clause 6 defines the basic AML libraries.

Clause 7 describes how to model user-defined data.

Clause 8 describes extended AML concepts.

Annex A gives an informative introduction, use cases and examples regarding AML.

Annex B gives an informative XML representation of the libraries defined in this part of IEC 62714.

¹ Under consideration.

ENGINEERING DATA EXCHANGE FORMAT FOR USE IN INDUSTRIAL AUTOMATION SYSTEMS ENGINEERING – AUTOMATION MARKUP LANGUAGE –

Part 1: Architecture and general requirements

1 Scope

This part of IEC 62714 specifies general requirements and the architecture of automation markup language (AML) for the modelling of engineering information, which is exchanged between engineering tools for industrial automation and control systems. Its provisions apply to the export/import applications of related tools.

This part of IEC 62714 does not define details of the data exchange procedure or implementation requirements for the import/export tools.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 62424:2016, *Representation of process control engineering – Requests in P&I diagrams and data exchange between P&ID tools and PCE-CAE tools*

IEC 62714 (all parts), *Engineering data exchange format for use in industrial automation systems engineering – Automation markup language*

ISO/PAS 17506, *Industrial automation systems and integration – COLLADA digital asset schema specification for 3D visualization of industrial data*

ISO/IEC 29500-2, *Information technology – Document description and processing languages – Office Open XML File Formats – Part 2: Open Packaging Conventions*

IETF RFC 2046, *Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types* [viewed 2017-11-13]. Available at <<http://www.ietf.org>>

IETF RFC 4122, *A Universally Unique Identifier (UUID) URN Namespace* [viewed 2017-11-13]. Available at <<http://www.ietf.org>>

IETF RFC 5646, *Tags for Identifying Languages* [viewed 2017-11-13]. Available at <<http://www.ietf.org>>

COLLADA 1.4.1:March 2008, *COLLADA – Digital Asset Schema Release 1.4.1* [viewed 2017-11-13]. Available at <http://www.khronos.org/files/collada_spec_1_4.pdf>

PLCopen XML 2.0:December 3rd 2008 and PLCopen XML 2.0.1:May 8th 2009, *XML formats for IEC 61131-3* [viewed 2017-11-13]. Available at <<http://www.plcopen.org>>