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Representation of process control engineering - Requests in P&I diagrams and data exchange between P&ID tools and PCE-CAE tools

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ICS 25.040.40, 35.240.50

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

Représentation de l'ingénierie de commande de processus - Demandes sous forme de diagrammes P&I et échange de données entre outils P&ID et outils PCE-CAE (IEC 62424:2016)

Darstellung von Aufgaben der Prozessleittechnik - Fließbilder und Datenaustausch zwischen EDV-Werkzeugen zur Fließbilderstellung und CAE-Systemen (IEC 62424:2016)

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European foreword

The text of document 65/544/CDV, future edition 2 of IEC 62424, prepared by IEC/TC 65 "Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62424:2016.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2017-05-19
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-08-19

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IEC 60848	NOTE	Harmonized as EN 60848.
IEC 61512-1	NOTE	Harmonized as EN 61512-1.
IEC 61987-1	NOTE	Harmonized as EN 61987-1.
ISO 10628-1	NOTE	Harmonized as EN ISO 10628-1.
ISO 10628-2	NOTE	Harmonized as EN ISO 10628-2.
ISO 13628-6	NOTE	Harmonized as EN ISO 13628-6.
ISO 13703	NOTE	Harmonized as EN ISO 13703.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61511-1	-	Functional safety - Safety instrumented systems for the process industry sector - Part 1: Framework, definitions, system, hardware and application programming requirements	EN 61511-1	-
IEC 81346-1	2009	Industrial systems, installations and equipment and industrial products - Structuring principles and reference designations - Part 1: Basic rules	EN 81346-1	2009
ISO 13849-1	-	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design	EN ISO 13849-1	-
W3C XML 1.0	2004	Extensible Markup Language (XML) 1.0	-	-

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CONTENTS

FOREWORD 8
INTRODUCTION 10
1 Scope 12
2 Normative references 12
3 Terms and definitions 12
4 Abbreviations 17
5 Conformity 18
6 Representation of PCE requests in a P&ID 19
6.1 PCE request and PCE loop 19
6.2 Objectives and principles 20
6.3 Requirements for the reference designation and representation of PCE requests 20
6.3.1 General 20
6.3.2 Types of lines 21
6.3.3 Displaying the location of the operator interface 21
6.3.4 PCE categories and processing functions 22
6.3.5 PCE request reference designation system 25
6.3.6 PU-vendor and typical identification 26
6.3.7 Device information 26
6.3.8 Alarming, switching and indicating 27
6.3.9 Safety-relevant, GMP and quality-relevant PCE requests 27
6.3.10 PCE control functions 28
7 Neutral data exchange of PCE relevant P&ID information 29
7.1 Objectives 29
7.2 Meaning of P&ID elements 29
7.3 PCE relevant information of P&ID tools 30
7.4 Formal description of PCE relevant information of P&ID tools 31
7.4.1 General object model of a plant hierarchy 31
7.4.2 General object model of a PCE request 31
7.5 Modeling PCE relevant information using the CAEX system description language 32
7.5.1 Overview 32
7.5.2 Basic CAEX mappings 33
7.5.3 Standard CAEX library of PCE request related attributes 34
7.5.4 Mapping of indirect links between PCE requests of different plant sections 35
7.5.5 CAEX description of direct links between PCE requests of different plant sections 38
7.5.6 PCE loops 40
8 Additional PCE attributes 40
Annex A (normative) CAEX – Data model for machine information exchange 42
A.1 CAEX and its diagram conventions 42
A.2 General CAEX concepts 43
A.2.1 General CAEX terms 43
A.2.2 General CAEX concept description 46
A.2.3 Data definition of SystemUnitClass 50

This document is a preview generated by EVS

A.2.4 Definition of attributes 52
A.2.5 Data definition of an AttributeType 54
A.2.6 Data definition of InterfaceClass 56
A.2.7 Data definition of RoleClass 59
A.2.8 Modelling of relations 60
A.2.9 Usage of paths 68
A.2.10 CAEX role concept 69
A.2.11 Use of the CAEX MappingObject 74
A.2.12 References to external CAEX files 76
A.3 CAEX schema definition 78
A.3.1 General 78
A.3.2 Element CAEXFile 79
A.3.3 CAEXFile/SuperiorStandardVersion 81
A.3.4 CAEXFile/ SourceDocumentInformation 81
A.3.5 CAEXFile/ExternalReference 82
A.3.6 CAEXFile/InstanceHierarchy 83
A.3.7 CAEXFile/InstanceHierarchy/InternalElement 84
A.3.8 CAEXFile/InterfaceClassLib 85
A.3.9 CAEXFile/InterfaceClass 86
A.3.10 CAEXFile/RoleClassLib 87
A.3.11 CAEXFile/RoleClass 88
A.3.12 CAEXFile/SystemUnitClassLib 89
A.3.13 CAEXFile/SystemUnitClass 90
A.3.14 CAEXFile/AttributeTypeLib 91
A.3.15 Group Header 93
A.3.16 CAEX complex type AttributeFamilyType 98
A.3.17 CAEX complex type AttributeFamilyType/AttributeType 99
A.3.18 CAEX complex type AttributeType 100
A.3.19 CAEX complex type CAEXBasicObject 108
A.3.20 CAEX complex type CAEXObject 109
A.3.21 CAEX complex type InterfaceClassType 110
A.3.22 CAEX complex type InterfaceFamilyType 113
A.3.23 CAEX complex type InternalElementType 115
A.3.24 CAEX complex type RoleClassType 123
A.3.25 CAEX complex type RoleFamilyType 125
A.3.26 CAEX complexType SourceDocumentInformationType 128
A.3.27 CAEX complex type SystemUnitClassType 129
A.3.28 CAEX complex type SystemUnitFamilyType 136
A.3.29 CAEX simpleType ChangeMode 138
Annex B (informative) Examples of PCE requests 139
Annex C (normative) Full XML schema of the CAEX model 149
Annex D (informative) CAEX modelling examples 155
D.1 CAEX Attribute Type Library definition for additional attributes 155
D.2 Example of CAEX InterfaceLib definition 156
D.3 Example of a CAEX RoleLib definition 157
D.4 Example CAEX definition of PCE relevant P&ID information 158
Annex E (informative) List of major changes and extensions of the second edition 163
Bibliography 166

This document is a preview generated by EVS

Figure 1 – Information flow between P&ID and PCE tool 11
Figure 2 – Organization of PCE requests 20
Figure 3 – General representation of a PCE-Request in a P&ID 21
Figure 4 – Multi-sensing element 21
Figure 5 – Local interface 22
Figure 6 – Manually operated switch in local control panel 22
Figure 7 – Pressure indication in central control room by a central control system 22
Figure 8 – Example of PCE request reference designation 26
Figure 9 – Example of flow measurement with indication in the CCR delivered by vendor A specified by typical identification A20 26
Figure 10 – Example of pH-measurement with indication in the CCR 26
Figure 11 – Example of flow measurement with indication in the CCR and high and low alarm 27
Figure 12 – Flow measurement with indication in the CCR and high alarm and a high-high switching function 27
Figure 13 – Flow measurement with indication in the CCR and a high-high switch limit, a high alarm, a low alarm and a low-low switch limit for a safety function 27
Figure 14 – GMP relevant, safety relevant and quality relevant flow measurement with indication in the CCR 28
Figure 15 – Control function 28
Figure 16 – Safety relevant control function 29
Figure 17 – P&ID elements and associations (PCE relevant items are shown in dark lines) 30
Figure 18 – Process data model (PCE relevant items are shown in dark lines) 31
Figure 19 – PCE request data model 32
Figure 20 – CAEX data model of major PCE request related attributes 35
Figure 21 – XML code of the attribute type library 35
Figure 22 – Example of two plant sections and a signal connection via external interfaces 36
Figure 23 – Simplified CAEX model of indirect links between PCE requests across different plant hierarchy items 37
Figure 24 – Simplified CAEX model of indirect links between PCE requests across different plant hierarchy items 38
Figure 25 – Example of two plant sections and a direct connection 39
Figure 26 – Simplified CAEX model of direct links between PCE requests across different sections of a plant 39
Figure 27 – XML code of the simplified CAEX model 40
Figure A.1 – XML text of the CAEX source document information 49
Figure A.2 – CAEX architecture of a SystemUnitClass 51
Figure A.3 – Example of a SystemUnitClassLib 51
Figure A.4 – XML code of the example of a SystemUnitClassLib 52
Figure A.5 – Examples of attributes 53
Figure A.6 – XML code of the example 54
Figure A.7 – Example of an AttributeTypeLib and its application in an instance hierarchy 55

This document is a preview generated by EVS

Figure A.8 – XML code of the AttributeTypeLib example 55
Figure A.9 – Example of an InterfaceClassLib 56
Figure A.10 – XML code of the example of an InterfaceClassLib 57
Figure A.11 – Second example of an InterfaceClassLib and the usage of nested interfaces 57
Figure A.12 – XML code of the second example 58
Figure A.13 – Usage of Links 59
Figure A.14 – XML code for the usage of links 59
Figure A.15 – Example of a RoleClassLib 60
Figure A.16 – Relations in CAEX 61
Figure A.17 – XML description of the relations example 62
Figure A.18 – XML text of the InstanceHierarchy of the relations example 62
Figure A.19 – XML text of the SystemUnitClassLib of the relations example 62
Figure A.20 – Example of a parent-child-relation between CAEX InternalElements 63
Figure A.21 – Example for a hierarchical plant structure 63
Figure A.22 – Example of a parent-child relation between classes 64
Figure A.23 – Multiple crossed structures 67
Figure A.24 – Example for mirror attributes and restructured mirror objects 67
Figure A.25 – CAEX role concept 70
Figure A.26 – CAEX data definition for use case 1 70
Figure A.27 – CAEX data definition for use case 2 71
Figure A.28 – CAEX data definition for use case 3 71
Figure A.29 – XML code for use case 3 72
Figure A.30 – Multiple role support 73
Figure A.31 – XML code of the multiple role support example 74
Figure A.32 – CAEX data definition of a MappingObject 75
Figure A.33 – XML code for the data definition of a MappingObject 76
Figure A.34 – Distribution of data in several CAEX files 77
Figure A.35 – Referencing of external CAEX files 77
Figure A.36 – XML code for referencing of external CAEX files 77
Figure A.37 – Example of how to use alias names 78
Figure A.38 – XML code for the alias example 78
Figure B.1 – Local level indication, 1 process connection 139
Figure B.2 – Local level indication, 2 process connections 139
Figure B.3 – Local flow indication 139
Figure B.4 – Local pressure indication 139
Figure B.5 – Local temperature indication 139
Figure B.6 – Local control panel, pressure indication, high alarm 140
Figure B.7 – Local temperature indication, CCR temperature high alarm 140
Figure B.8 – Local pressure indication, CCR pressure high alarm and switch 140
Figure B.9 – CCR flow indication, device information: Orifice Plate 140
Figure B.10 – CCR pressure indication, low, low low and high alarm 140
Figure B.11 – CCR temperature indication and registration 141

This document is a preview generated by EVS

Figure B.12 – CCR level indication and registration, 1 process connection 141
Figure B.13 – CCR level indication, 2 process connections 141
Figure B.14 – Two flow indications and flow ratio control in CCR 141
Figure B.15 – CCR flow indication and high alarm, flow control, control valve with extra interlock and open/close indication 142
Figure B.16 – Local pressure indication, CCR pressure indication, high alarm and high high safety relevant switch; representation of transmitters with integrated local display (if not otherwise defined in a specification of the field device) 142
Figure B.17 – Local pressure indication, CCR pressure indication, alarms and switches 142
Figure B.18 – CCR pressure indication, high and low alarm, safety relevant switch action on on/off valve 143
Figure B.19 – Switched valve with on/off indication and switching action, safety relevant switched valve 143
Figure B.20 – Pressure restriction 143
Figure B.21 – Flow restriction 143
Figure B.22 – PT compensated flow control, safety-relevant pressure switch (two out of three (2oo3) shutdown), switched control valve with on/off indication and switching action at open position 144
Figure B.23 – CCR temperature control, additional manual switch actions from CCR with indication and local control panel 144
Figure B.24 – Motor typical, local on/off control, CCR off control, current, fault with alarm and running indication 145
Figure B.25 – Multivariable controller 145
Figure B.26 – On/off valve with position indication 146
Figure B.27 – On/off valve with safety relevant switch and position indication 146
Figure B.28 – Level control with continuous controller 146
Figure B.29 – Level control with on/off switch 146
Figure B.30 – Cascade control for temperature as control input, flow control as follow-up controller 147
Figure B.31 – Safety directed high control to a subsequent valve, manual control for reset function and manual control for manual/automatic switch of the valve, valve with open/close indication and safety-relevant switch to subsequent valve 147
Figure B.32 – Flow control in CCR 147
Figure B.33 – Temperature control with high alarm and high switch 148
Figure B.34 – Manual control from CCR 148
Figure B.35 – Flow measurement with display and alarms in CCR, high high switch on process control function and switch on/off valve 148
Figure B.36 – Local P-/F-/T-/S- control without auxiliary power (stand-alone) 148
Figure C.1 – Full XML text of the CAEX Schema file “CAEX_ClassModel_V.3.0.xsd” 154
Figure D.1 – Attribute type library with additional PCE request related attributes 155
Figure D.2 – XML code of the Attribute type library 156
Figure D.3 – Example of CAEX interface library 156
Figure D.4 – XML code of the example CAEX interface library 156
Figure D.5 – Example CAEX role library illustrating the modeling of a PCE request role referencing PCE request related attributes 157
Figure D.6 – XML code for the example CAEX role library 158
Figure D.7 – Example P&ID data to be mapped with CAEX 159

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Figure D.8 – CAEX model of the example described in Figure D.7 160
Figure D.9 – XML code of the example described in Figure D.7 162

Table 1 – Abbrevations 17
Table 2 – PCE categories 23
Table 3 – PCE processing function 24
Table 4 – Sequence combinations 25
Table 5 – PCE processing functions for final controlling equipments 25
Table 6 – P&ID attributes relevant in PCE environment 41
Table 7 – Data handling attributes 41
Table A.1 – XML notation conventions 42
Table A.2 – CAEX data types and elements 43

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INTRODUCTION

Efficient process engineering requires highly sophisticated tools for the different needs of the involved work processes and departments. These engineering tools are normally specialized in Process Design (PD), in Process Control Engineering (PCE), etc. Therefore, a working interoperability is essential to optimize the engineering process in total. Thus, the definition of a harmonized interface and data management is a core task to ensure a smooth workflow during the whole project and to guarantee data consistency in the different tools.

This standard defines procedures and specifications for the exchange of PCE relevant data provided by the Piping and Instrumentation Diagram (P&ID) tool. The basic requirements for a change management procedure are described. A generally accepted technology for machine information exchange, the Extensible Markup Language (XML) is used. Hereby, a common basis is given for information integration.

However, a definition for uniform semantics is still necessary. CAEX (Computer Aided Engineering eXchange) as it is defined in this document is an appropriate data format for this purpose. This concept of data exchange is open for different applications.

The main task of a data exchange is transporting/synchronizing information from the P&ID database to the PCE databases and vice versa. The owner's reference designation system and a unique description of the processing requirement is the key for a unique identification. For detailed information about representation of PCE loops in P&IDs see Clause 6.

The data exchange system may be a stand-alone, vendor independent application or a module in an engineering environment. The data between a P&ID tool and a PCE tool and vice versa is exchanged via CAEX.

After the data exchange, there are three places where information about the plant is stored. Both the proprietary databases of the considered tools include private and common information. Both are stored at different places and in different divisions that are working on them. Hereby, the intermediate database CAEX only stores common information. In a wider approach, the intermediate database should store both common and private information. This becomes important if a third application is connected to the neutral database. If the intermediate database is used as a temporary data stream only (without storing the information in a file), the information will be lost after processing the data conciliation.

Figure 1 illustrates the information flow for the P&ID and the PCE database reconciliation. The data exchange is done via a neutral intermediate CAEX database, not directly from database to database. The intermediate CAEX database should be a file (for file based data exchange) or a stream (for network based data exchange). The term “CAEX database” within this standard has to be understood in this way, it does not denominate a database product as for example SQL.

Annex C of this standard contains the full XML schema of the CAEX Model. It is attached to this publication in XSD format.

NOTE Buyers of this publication can copy it for their own purposes only in the required amount.

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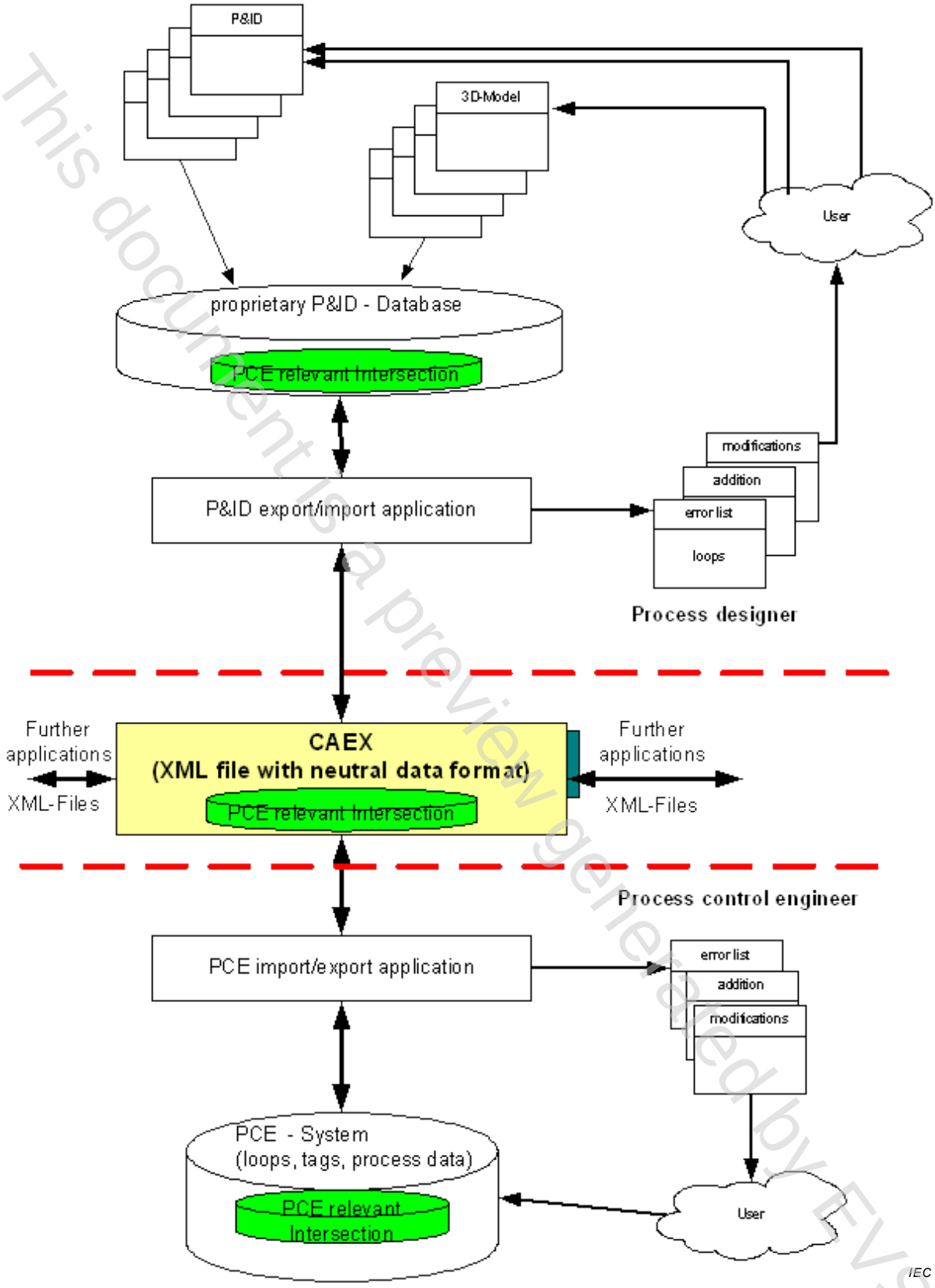

Figure 1 – Information flow between P&ID and PCE tool

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