

© Copyright SEK. Reproduction in any form without permission is prohibited.

Integrering av processtyrning och affärssystem – Del 3: Aktivitetsmodeller för produktionsstyrning

Enterprise-control system integration –

Part 3: Activity models of manufacturing operations management

Som svensk standard gäller europastandarden EN 62264-3:2007. Den svenska standarden innehåller den officiella engelska språkversionen av EN 62264-3:2007.

Nationellt förord

Europastandarden EN 62264-3:2007

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 62264-3, First edition, 2007 - Enterprise-control system integration - Part 3: Activity models of manufacturing operations management**

utarbetad inom International Electrotechnical Commission, IEC.

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

**Enterprise-control system integration -
Part 3: Activity models of manufacturing operations management
(IEC 62264-3:2007)**

Intégration du système
de commande d'entreprise -
Partie 3: Modèles d'activités
pour la gestion des opérations
de fabrication
(CEI 62264-3:2007)

Integration von Unternehmens-EDV
und Leitsystemen -
Teil 3: Aktivitätsmodelle
für das operative
Produktionsmanagement
(IEC 62264-3:2007)

This European Standard was approved by CENELEC on 2007-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 65A/476/CDV, future edition 1 of IEC 62264-3 prepared by SC 65A, System aspects, of IEC TC 65, Industrial-process measurement and control, and SC 5, JWG 15, of ISO TC 184, Enterprise-control system integration, was submitted to the IEC-CENELEC parallel Unique Acceptance Procedure and was approved by CENELEC as EN 62264-3 on 2007-07-01.

The following dates were fixed:

- | | | |
|--|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2008-04-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2010-07-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62264-3:2007 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 61131-3	NOTE	Harmonized as EN 61131-3:2003 (not modified).
-------------	------	---

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61512-1	1997	Batch control - Part 1: Models and terminology	EN 61512-1	1999
IEC 62264-1	- ¹⁾	Enterprise-control system integration - Part 1: Models and terminology	-	-
IEC 62264-2	- ¹⁾	Enterprise-control system integration - Part 2: Object model attributes	-	-
ISO 15704	2000	Industrial automation systems - Requirements - for enterprise-reference architectures and methodologies		-

¹⁾ Undated reference.

CONTENTS

1	Scope	9
2	Normative references	9
3	Terms, definitions and abbreviations	9
3.1	Terms and definitions	9
3.2	Abbreviations	11
4	Structuring models	12
4.1	Manufacturing operations management	12
4.2	Functional hierarchy	13
4.3	Manufacturing operations management elements	15
4.4	Criterion for defining activities below Level 4	15
4.5	Categories of production information	15
4.6	Manufacturing operations information	16
5	Structuring models	17
5.1	Generic template for categories of manufacturing operations management	17
5.2	Interaction among generic activity models	18
5.3	Expanded equipment hierarchy model	20
5.4	Expanded decision hierarchy model	22
5.5	Hierarchy of planning and scheduling	25
5.6	Resource definition for scheduling activities	26
6	Production operations management	27
6.1	General activities in production operations management	27
6.2	Production operations management activity model	27
6.3	Information exchange in production operations management	28
6.4	Product definition management	29
6.5	Production resource management	31
6.6	Detailed production scheduling	34
6.7	Production dispatching	37
6.8	Production execution management	41
6.9	Production data collection	42
6.10	Production tracking	43
6.11	Production performance analysis	45
7	Maintenance operations management	50
7.1	General activities in maintenance operations management	50
7.2	Maintenance operations management activity model	50
7.3	Information exchanged in maintenance operations management	51
7.4	Maintenance definition management	53
7.5	Maintenance resource management	54
7.6	Detailed maintenance scheduling	54
7.7	Maintenance dispatching	55
7.8	Maintenance execution management	55

7.9	Maintenance data collection	55
7.10	Maintenance tracking	55
7.11	Maintenance analysis	56
8	Quality operations management	57
8.1	General activities in quality operations management	57
8.2	Quality test operations activity model	59
8.3	Information exchanged in quality test operations management	60
8.4	Quality test definition management.....	62
8.5	Quality test resource management	62
8.6	Detailed quality test scheduling	63
8.7	Quality test dispatching	64
8.8	Quality test execution management.....	64
8.9	Quality test data collection	65
8.10	Quality test tracking	65
8.11	Quality performance analysis	65
8.12	Supported activities.....	66
9	Inventory operations management.....	67
9.1	General activities in inventory operations management	67
9.2	Inventory operations management activity model	68
9.3	Information exchanged in inventory operations management.....	69
9.4	Inventory definition management.....	70
9.5	Inventory resource management	70
9.6	Detailed inventory scheduling.....	71
9.7	Inventory dispatching	72
9.8	Inventory execution management.....	72
9.9	Inventory tracking.....	73
9.10	Inventory analysis	74
10	Completeness, compliance and conformance	75
10.1	Completeness	75
10.2	Compliance	75
10.3	Conformance.....	75
	Annex A (informative) Other enterprise activities affecting manufacturing operations	76
	Annex B (informative) Technical and responsibility boundaries	81
	Annex C (informative) Scheduling hierarchy.....	86
	Annex D (informative) Associated standards.....	88
	Annex E (informative) Frequently asked questions.....	92
	Annex F (informative) Applying the decision hierarchy model to manufacturing operations management.....	95
	Annex G (informative) Mapping PSLX ontology to manufacturing operations management..	100
	Annex H (informative) Advanced planning and scheduling concepts for manufacturing operations management.....	105
	Bibliography.....	109
	Figure 1 – Manufacturing operations management model	13

Figure 2 – Multi-level functional hierarchy of activities	14
Figure 3 – Activity relationships	14
Figure 4 – Categories of information exchange	16
Figure 5 – Manufacturing operations information.....	17
Figure 6 – Generic activity model of manufacturing operations management	18
Figure 7 – Detailed scheduling interactions.....	20
Figure 8 – Typical expanded equipment hierarchy	21
Figure 9 – Work centres and work units	22
Figure 10 – Decision hierarchy model framework for Level 3.....	23
Figure 11 – Decision-making with two variables	24
Figure 12 – Schematic relationship of planning and scheduling.....	25
Figure 13 – Projected inventory for a consumable resource	26
Figure 14 – Activity model of production operations management.....	28
Figure 15 – Product definition management activity model interfaces.....	29
Figure 16 – Production resource management activity model interfaces.....	31
Figure 17 – Resource management capacity reporting.....	33
Figure 18 – Detailed production scheduling activity model interfaces	35
Figure 19 – Splitting and merging production schedules to detailed production schedules	36
Figure 20 – Detailed production schedule	37
Figure 21 – Production dispatching activity model interfaces	38
Figure 22 – Sample production dispatch list.....	39
Figure 23 – Work dispatching for mixed process facility	40
Figure 24 – Production execution management activity model interfaces	41
Figure 25 – Production data collection activity model interfaces.....	43
Figure 26 – Production tracking activity model interfaces.....	44
Figure 27 – Merging and splitting production tracking information	45
Figure 28 – Production performance analysis activity model interfaces	46
Figure 29 – Activity model of maintenance operations management.....	51
Figure 30 – Activity model of quality test operations management	60
Figure 31 – Activity model of inventory operations management	68
Figure 32 – Inventory data collection activity model	73
Figure A.1 – Other enterprise activities affecting manufacturing operations	76
Figure A.2 – Functions in management of regulatory compliance	79
Figure B.1 – Different boundaries of responsibility	82
Figure B.2 – Lines of technical integration	84
Figure C.1 – Sample hierarchy of schedules and scheduling activities.	87
Figure E.1 – PRM scope and standard focus	93
Figure F.1 – Decision hierarchy within an operational category.....	96
Figure F.2 – Decision hierarchy within an activity.....	96
Figure F.3 – Examples of decision hierarchies for resource management	97
Figure G.1 – PSLX ontology, part 1.....	103
Figure G.2 – PSLX ontology, part 2.....	103
Figure G.3 – PSLX ontology, part 3.....	104
Figure H.1 – Levels of decision-making for production	107

Table 1 – Storage zone and storage unit examples	21
Table G.1 – IEC 62264 relationship to PSLX.....	101

ENTERPRISE-CONTROL SYSTEM INTEGRATION –

Part 3: Activity models of manufacturing operations management

1 Scope

This part of IEC 62264 defines activity models of manufacturing operations management that enable enterprise system to control system integration. The activities defined in this standard are consistent with the object models definitions given in IEC 62264-1. The modelled activities operate between business planning and logistics functions, defined as the Level 4 functions and the process control functions, defined as the Level 2 functions of IEC 62264-1. The scope of this standard is limited to

- a model of the activities associated with manufacturing operations management, Level 3 functions;
- an identification of some of the data exchanged between Level 3 activities.

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.

IEC 61512-1:1997, *Batch control – Part 1: Models and terminology*

IEC 62264-1, *Enterprise-control system integration – Part 1: Models and terminology*

IEC 62264-2, *Enterprise-control system integration – Part 2: Object model attributes*

ISO 15704:2000, *Industrial automation systems – Requirements for enterprise-reference architecture and methodologies*