

#### SLOVENSKI STANDARD SIST EN 62682:2015

01-junij-2015

#### Upravljanje alarmov za procesno industrijo (IEC 62682:2014)

Management of alarms for the process industries (IEC 62682:2014)

Alarmmanagement in der Prozessindustrie (IEC 62682:2014)

Gestion de systèmes d'alarme dans les industries de transformation (IEC 62682:2014)

Ta slovenski standard je istoveten z: EN 62682:2015

SIST EN 62682:2015

https://standards.iteh.ai/catalog/standards/sist/82aa14e3-3d99-416f-a49a-f2000b0aba45/sist-en-62682-2015

ICS:

13.320 Alarmni in opozorilni sistemi Alarm and warning systems

25.040.01 Sistemi za avtomatizacijo v Industrial automation industriji na splošno systems in general

industriji na spiosno systems in general

SIST EN 62682:2015 en,fr,de

**SIST EN 62682:2015** 

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 62682:2015

https://standards.iteh.ai/catalog/standards/sist/82aa14e3-3d99-416f-a49a-f2000b0aba45/sist-en-62682-2015

EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM EN 62682

January 2015

ICS 13.320; 25.040

#### **English Version**

### Management of alarms systems for the process industries (IEC 62682:2014)

Gestion de systèmes d'alarme dans les industries de transformation (IEC 62682:2014) Alarmmanagement in der Prozessindustrie (IEC 62682:2014)

This European Standard was approved by CENELEC on 2014-11-19. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

(standards.iteh.ai)

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom. Standards, Itela av catalog standards, Standards, 2019-4101-a49a-

f2000b0aba45/sist-en-62682-2015



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

#### **Foreword**

The text of document 65A/704/FDIS, future edition 1 of IEC 62682, prepared by SC 65A "System aspects" of IEC/TC 65 "Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62682:2015.

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)	2015-08-19
•	latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2017-11-19

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

#### **Endorsement notice**

The text of the International Standard IEC 62682:2014 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61511 Series NOTE SHarmonized as EN 61511 Series (not modified).

IEC 61511-1 NOTE Harmonized as EN 61511-1.

SIST EN 62682-2015
Harmonized as EN 62541-9.

11-9 NOTE Harmonized as EN 62541-9 https://standards.iteh.avcatalog/standards/sis/82aa14e3-3d99-416f-a49a-

f2000b0aba45/sist-en-62682-2015



IEC 62682

Edition 1.0 2014-10

# INTERNATIONAL STANDARD

### NORME INTERNATIONALE

Management of alarms systems for the process industries

Gestion de systèmes d'alarme dans les industries de transformation

SIST EN 62682:2015

https://standards.iteh.ai/catalog/standards/sist/82aa14e3-3d99-416f-a49a-f2000b0aba45/sist-en-62682-2015

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE CODE PRIX

ICS 13.320; 25.040 ISBN 978-2-8322-1868-6

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

۱-(	JKEWOF	RD	9
IN	ITRODU	CTION	11
1	Scope	<b>.</b>	12
	1.1	General applicability	12
	1.2	Exclusions and inclusions	13
	1.2.1	Operators	13
	1.2.2	Process sensors and final control elements	13
	1.2.3	Safety instrumented systems	13
	1.2.4	Event data	13
	1.2.5	Alarm identification methods	14
	1.2.6	Management of change	14
2	Norma	ative references	14
3	Terms	s, definitions, and abbreviations	14
	3.1	Terms and definitions	14
	3.2	Abbreviations	22
4	Confo	rmance to this standard	22
	4.1	Conformance guidance	22
	4.2	Conformance guidance	23
5	Alarm	Responsibility (standards.iteh.ai) system models	23
		Alarm systemssist EN 626822015	
		Alarm managementdifecycletalog/standards/sist/82aa14e3-3d99-416f-a49a	
	5.2.1	Alarm management lifecycle model-62682-2015	
	5.2.2	Alarm management lifecycle stages	
	5.2.3	Alarm lifecycle entry points	
	5.2.4	Simultaneous and encompassing stages	
	5.2.5	Alarm management lifecycle loops	
	5.2.6	Alarm management lifecycle stage inputs and outputs	
	5.3	Alarm states	29
	5.3.1	Alarm state transition diagram	29
	5.3.2	Alarm states	30
	5.3.3	Alarm state transition paths	31
	5.4	Alarm response timeline	32
	5.4.1	General	32
	5.4.2	Normal (A)	33
	5.4.3	Unacknowledged (B)	33
	5.4.4	Acknowledged (C) and response	33
	5.4.5	Return-to-normal (D)	34
	5.4.6	Consequence threshold	34
	5.5 l	Feedback model of operator-process interaction	34
	5.5.1	General	34
	5.5.2	Detect	35
	5.5.3	Diagnose	
	5.5.4	Respond	35
	5.5.5	Performance shaping factors	35
6	Alarm	philosophy	35

	6.1	Purpose	.35
	6.2	Alarm philosophy contents	.35
	6.2.1	General	.35
	6.2.2	Purpose of alarm system	.36
	6.2.3	Definitions	.37
	6.2.4	References	.37
	6.2.5	Roles and responsibilities for alarm management	.37
	6.2.6	Alarm design principles	.37
	6.2.7	Rationalization	.37
	6.2.8	Alarm class definition	.37
	6.2.9	Highly managed alarms	.38
	6.2.10	) HMI design principles	.38
	6.2.11	Prioritization method	.38
	6.2.12	2 Alarm setpoint determination	.39
	6.2.13	Alarm system performance monitoring	.39
	6.2.14	Alarm system maintenance	.39
	6.2.15	5 Testing of the alarm system	.39
	6.2.16		
	6.2.17		
	6.2.18		.40
	6.2.19		
	6.2.20	Training	.40
	6.2.21	Alarm history preservation	.40
	6.2.22	Related site procedures SIST FN 626822015	.40
	6.2.23	nubs://standards.nema/catalog/standards/sist/82aa14e3-3d99-4161-a49a-	.41
	6.2.24	Alarm system audit2000b0aba45/sist-en-62682-2015	.41
		Alarm philosophy development and maintenance	
7	Alarm	system requirements specification	.41
		Purpose	.41
		Recommendations	
		Development	
	7.4	Systems evaluation	.42
		Customization	
		Alarm system requirements testing	
8	Identi <sup>-</sup>	fication	.43
		Purpose	
	8.2	Alarm identification methods	.43
		Identification training	
9	Ration	nalization	.43
	9.1	Purpose	.43
	9.2	Rationalization documentation	.44
	9.2.1	Rationalization documentation requirements	.44
	9.2.2	Rationalization documentation recommendations	.44
	9.3	Alarm justification	.44
	9.3.1	Alarm justification process	.44
	9.3.2	Justification approach	.44
	9.3.3	Individual alarm justification	
	9.3.4	Impact on alarm system	
	9.4	Alarm setpoint determination	.45

	9.5	Prioritization	45
	9.6	Removal	45
	9.7	Classification	46
	9.8	Review	
	9.9	Use of documentation	_
10	Detai	iled design: Basic alarm design	46
	10.1	Purpose	46
	10.2	Usage of alarm states	46
	10.2.	1 Alarm state triggering	46
	10.2.	2 Alarm states and other logic functions	46
	10.2.	3 Alarm suppression and other logic functions	47
	10.3	Alarm types	47
	10.4	Alarm attributes	47
	10.4.	1 General	47
	10.4.	2 Alarm description	48
	10.4.	3 Alarm setpoints	48
	10.4.	4 Alarm priority	48
	10.4.	5 Alarm deadbands	48
	10.4.	<b>, ,</b>	
	10.5	Programmatic changes to alarm attributes  Review basic alarm design NDARD PREVIEW	49
11	Detai	led design: Human-machine interface design for alarm systems	49
	11.2	HMI functionsSIST EN 626822015	49
	11.2.	100757,5001100110011001001001001001001001001001	
	11.2.	2 HMI information requirements/sist-en-62682-2015	49
	11.2.	3 HMI functional requirements	50
	11.2.	4 HMI display requirements	50
	11.2.	•	
	11.2.	6 Alarm records recommendations	50
		Alarm states indications	
	11.3.		
	11.3.	'	
	11.3.		
	11.3.		
		Alarm priority indications	
	11.4.		
	11.4.	, , ,	
	11.4.	·	
	11.4.	, ,	
		Alarm message indications	
	11.5.		
	11.5.	5	
		Alarm displays	
	11.6.		
	11.6.	, , ,	
	11.6.3	,	
	11.6.4	9 1 7	
	11.6.	5 Process displays	96

11.6	.6 Tag detail displays	56
11.6	.7 Other display elements	56
11.7	Alarm shelving	56
11.7	.1 General	56
11.7	.2 Alarm shelving functional requirements	56
11.7	.3 Alarm shelving functional recommendations	57
11.7	.4 Shelved alarm displays	57
11.8	Out-of-service alarms	57
11.8	.1 General	57
11.8	.2 Out-of-service alarm functional requirements	58
11.8	.3 Out-of-service alarm displays	58
11.9	Alarms suppressed by design	58
11.9	.1 General	58
11.9	.2 Designed suppression functional requirements	58
11.9	.3 Design suppression functional recommendations	59
11.9	.4 Suppressed-by-design displays	59
11.10	Alarm annunciator integration	59
11.10	0.1 General	59
11.10	0.2 Alarm annunciator integration recommendations	59
11.10	1 7 5	
11.11	Safety alarm HMIN. STANDARD PREVIEW	60
11.1	1.1 General	60
11.1	· ·   · · · · · · · · · · · / · ·	60
12 Deta	niled design: Enhanced and advanced alarm methods	60
12.1	Purpose https://standards.iteh.ai/catalog/standards/sist/82aa14e3-3d99-416f-a49a	60
12.2	Basis of enhanced and advanced alarming 682-2015	
12.2	.1 General	60
12.2	.2 Effort, manpower requirements and complexity	60
12.3	Information linking	61
12.4	Logic-based alarming	61
12.4	.1 General	61
12.4	.2 Alarm attribute modification	61
12.4	.3 Externally enabled systems	61
12.4	.4 Logical alarm suppression and attribute modification	61
12.4	.5 State-based alarming	61
12.5	Model-based alarming	
12.6	Additional alarming considerations	62
12.6		
12.6		
12.6	•	62
12.6		
12.6	•	
12.7	Training, testing, and auditing systems	
12.8	Alarm attribute enforcement	
13 Imple	ementation	63
13.1	Purpose	63
13.2	Implementation planning	63
13.3	Implementation training	63
13.3	.1 General	63

13.3.2	Implementation training	63
13.3.3	Implementation training requirements	64
13.3.4	Training documentation requirements for highly managed alarms	64
13.3.5	Training documentation recommendations	64
13.3.6	Implementation training requirements for new or modified alarm	
	systems	64
13.3.7	Implementation training recommendations for new or modified alarm	0.4
40.4	systems	
•	lementation testing and validation	
13.4.1	General	
13.4.2	Implementation testing requirements for highly managed alarms	
13.4.3	Implementation testing recommendations for new or modified alarms	
13.4.4	Implementation testing requirements for new or modified alarm systems	
•	lementation documentation	
13.5.1	General	
13.5.2	Documentation requirements	
13.5.3	Implementation documentation recommendations	
•	າ	
	pose	
14.2 Ala	rm response procedures	
14.2.1	Alarm response procedures requirements D. P. V	66
14.2.2	Alarm response procedure recommendations	66
14.3 Ala	m shelving (standards.iteh.ai)	
14.3.1	Alarm shelving requirements	66
14.3.2	Alarm shelving for highly managed alarms  Alarm shelving recommendations  2000b0aba45/sist-en-62682-2015	67
14.3.3	Alarm shelving recommendations	67
14.3.4	Alarm shelving record requirements	67
14.4 Ref	resher training for operators	67
14.4.1	Refresher training requirements for operators	67
14.4.2	Refresher training documentation for highly managed alarms	67
14.4.3	Refresher training content for highly managed alarms	67
14.4.4	Refresher training recommendations for alarms	67
15 Maintena	nce	68
15.1 Pur	pose	68
15.2 Per	iodic alarm testing	68
15.2.1	General	68
15.2.2	Periodic alarm testing requirements	68
15.2.3	Periodic alarm testing for highly managed alarms	68
15.2.4	Periodic alarm test procedure requirements	68
15.2.5	Periodic alarm test procedure recommendations	68
15.2.6	Periodic alarm testing recommendations	69
15.3 Out	-of-service alarms	69
15.3.1	General	69
15.3.2	Out-of-service process requirements	69
15.3.3	Out-of-service highly managed alarms	69
15.3.4	Out-of-service process recommendations	
15.3.5	Requirements for returning alarms to service	
15.4 Equ	ipment repair	69
•	ipment replacement	
•		

	15.6	Refresher training for maintenance	70
	15.6.	.1 General requirements	70
	15.6.	.2 Refresher training requirements for highly managed alarms	70
	15.6.		
16	Moni	toring and assessment	
	16.1	Purpose	
	16.2	Requirements	
	16.3	Monitoring, assessment, audit, and benchmark	
	16.4	Alarm system monitoring	
	16.5	Alarm system performance metrics	
	16.5.		
	16.5.		
	16.5.	·	
	16.5.		
	16.5.		
	16.5.	, ,	
	16.5.	3	
	16.5.		
	16.5.	, ,	
	16.5. 16.6	· · · ·	
	16.7	Unauthorized alarm suppression.  Alarm attribute monitoring ANDARD PREVIEW.	74 7 <i>1</i>
	16.8		
	16.9	Reporting of alarm system analyses  Alarm performance metric summary	74
		agement of change <u>SIST EN 62682:2015</u>	75
	17.1	Purpose https://standards.iteh.ai/catalog/standards/sist/82aa14e3-3d99-416f-a49a-	
	17.2	Changes subject to management of change 82-2015	
	17.3	Change documentation requirements	
	17.4	Change documentation recommendations	
	17.5	Alarm removal recommendations	
	17.6	Alarm attribute modification recommendations	
18	Audit	t	77
	18.1	Purpose	77
	18.2	Benchmark	77
	18.2.	.1 General	77
	18.2.	.2 Initial audit or benchmark requirements	77
	18.3	Audit interviews	77
	18.4	Audit recommendations	77
	18.5	Action plans	78
Bib	liograp	phy	79
Fia	ure 1 –	– Alarm system dataflow	13
_		·	
_		- Alarm management lifecycle	
_		– Alarm state transition diagram	
_		- Alarm response timeline	
Fig	ure 5 –	- Feedback model of operator-process interaction	35
Tak	nle 1 –	Alarm management lifecycle stage inputs and outputs	28

**-8-**

IEC 62682:2014 © IEC 2014
---------------------------

Table 2 – Alarm states	31
Table 3 – Required and recommended alarm philosophy content	
Table 4 – Recommended alarm state indications	52
Table 5 – Average alarm rates	72
Table 6 – Annunciated alarm priority distribution	73
Table 7 – Recommended alarm performance metrics summary	7.5

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 62682:2015

https://standards.iteh.ai/catalog/standards/sist/82aa14e3-3d99-416f-a49a-f2000b0aba45/sist-en-62682-2015

#### INTERNATIONAL ELECTROTECHNICAL COMMISSION

#### MANAGEMENT OF ALARMS SYSTEMS FOR THE PROCESS INDUSTRIES

#### **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 ds/sist/82aa14e3-3d99-416f a49a-
- 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 62682 has been prepared by subcommittee 65A: System aspects, of IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this standard is based on the following documents:

FDIS	Report on voting
65A/704/FDIS	65A/706/RVD

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

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

**- 10 -**

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

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

### iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 62682:2015

https://standards.iteh.ai/catalog/standards/sist/82aa14e3-3d99-416f-a49a-f2000b0aba45/sist-en-62682-2015

\_ 11 \_

#### INTRODUCTION

#### **Purpose**

This International Standard addresses the development, design, installation, and management of alarm systems in the process industries. Alarm management includes multiple work processes throughout the alarm system lifecycle. This standard defines the terminology and models to develop an alarm system, and it defines the work processes recommended to effectively maintain the alarm system throughout the lifecycle.

This standard was adapted from ANSI/ISA-18.2-2009, *Management of Alarm Systems for the Process Industries*, an International Society of Automation (ISA) standard, and with due consideration of other guidance documents that have been developed throughout industry. Ineffective alarm systems have often been cited as contributing factors in the investigation reports following major process incidents. This standard is intended to provide a methodology that will result in the improved safety of the process industries.

This standard is not the first effort to define terminology and practices for effective alarm systems. In 1999 the Engineering Equipment and Materials Users' Association (EEMUA) issued Publication 191, *Alarm Systems: A Guide to Design, Management and Procurement.* In 2003 the User Association of Process Control Technology in Chemical and Pharmaceutical Industries (NAMUR) issued worksheet NA 102, *Alarm Management*.

During the development of this standard every effort was made to keep terminology and practices consistent with the previous work of these respected organizations and committees.

This document provides requirements for alarm management and alarm systems. It is intended for those individuals and organizations that

SIST EN 62682:2015

- a) manufacture or implement embedded alarm systems a14e3-3d99-416f-a49a-
- b) manufacture or implement third-party alarm system software,
- c) design or install alarm systems,
- d) operate and/or maintain alarm systems, and
- e) audit or assess alarm system performance.

#### Organization

This standard is organized in two parts. The first part is introductory in nature, (Clauses 1 to 5). The main body of the standard follows (Clauses 6 to 18).