

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Automation systems in the process industry –
Factory acceptance test (FAT), site acceptance test (SAT), and site integration
test (SIT)**

**Systèmes d'automatisation dans l'industrie de transformation –
Essais d'acceptation en usine (FAT), essais d'acceptation sur site (SAT) et
essais d'intégration sur site (SIT)**



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CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
1.1 General applicability	9
1.2 Exclusions	9
1.2.1 Prior- and post-test activities	9
1.2.2 Regulated industries	9
1.2.3 Safety instrumented systems	9
1.2.4 Manufacturing execution systems	9
1.2.5 Advanced process control.....	9
1.2.6 Security for industrial automation and control systems.....	9
2 Normative references	10
3 Terms, definitions and abbreviated terms	10
3.1 Terms and definitions.....	10
3.2 Abbreviated terms.....	13
4 Overview of automation system testing.....	13
4.1 General.....	13
4.2 Methods of test performance.....	14
4.3 Project design changes.....	14
4.4 Adapted procedures in the event of modifications to existing systems.....	14
5 Factory acceptance test (FAT).....	15
5.1 General.....	15
5.2 Performance	15
5.3 Pre-FAT activities	15
5.3.1 General	15
5.3.2 Vendor tests	15
5.3.3 Documentation	15
5.3.4 Test plan	16
5.3.5 Test schedule	16
5.4 FAT punch list.....	17
5.4.1 General	17
5.4.2 Correction.....	17
5.4.3 Corrections after FAT	17
5.5 Documentation of FAT	18
5.5.1 General	18
5.5.2 FAT report.....	18
5.5.3 FAT final documentation	18
5.6 FAT completion.....	18
6 Factory integration test (FIT)	19
6.1 General.....	19
6.2 Performance	19
6.3 Pre-FIT activities.....	19
6.3.1 General	19
6.3.2 Test plan	19
6.3.3 Test schedule	19
6.4 FIT punch list.....	20

- 6.4.1 General 20
- 6.4.2 Correction..... 20
- 6.4.3 Correction after FIT 20
- 6.5 Documentation of FIT..... 21
 - 6.5.1 General 21
 - 6.5.2 FIT report 21
 - 6.5.3 FIT final documentation 21
- 6.6 FIT completion 21
- 7 Site acceptance test (SAT) 21
 - 7.1 Performance 21
 - 7.2 Pre-SAT activities 22
 - 7.2.1 General 22
 - 7.2.2 Test plan 22
 - 7.2.3 Test schedule 23
 - 7.3 SAT punch list 23
 - 7.3.1 General 23
 - 7.3.2 Correction..... 23
 - 7.3.3 Correction after SAT 23
 - 7.4 Documentation of SAT 24
 - 7.4.1 General 24
 - 7.4.2 SAT report..... 24
 - 7.4.3 SAT final documentation..... 24
 - 7.5 SAT completion 24
- 8 Site integration test (SIT)..... 24
 - 8.1 Performance 24
 - 8.2 Pre-SIT activities 25
 - 8.2.1 General 25
 - 8.2.2 Test plan 25
 - 8.2.3 Test schedule 25
 - 8.3 SIT punch list..... 26
 - 8.3.1 General 26
 - 8.3.2 Correction..... 26
 - 8.3.3 Correction after SIT 26
 - 8.4 Documentation of SIT 27
 - 8.4.1 General 27
 - 8.4.2 SIT report 27
 - 8.4.3 SIT final documentation 27
 - 8.5 SIT completion..... 27
- Annex A (informative) Factory acceptance testing checklist 28
 - A.1 General..... 28
 - A.2 Assemble documentation 28
 - A.2.1 General 28
 - A.2.2 User requirements specification 28
 - A.2.3 Functional requirements specification 28
 - A.2.4 Information to vendor 29
 - A.2.5 Vendor documentation 29
 - A.3 Develop a written test plan and specification..... 29
 - A.3.1 General 29
 - A.3.2 Documentation 29

A.3.3	Hardware/software inventory	30
A.3.4	Mechanical inspection	30
A.3.5	Wiring and termination inspection	30
A.3.6	Start-up, shut-down and re-start test and general system functions	30
A.3.7	System alarm test	31
A.3.8	Hardware redundancy and diagnostics (including fail and changeover of redundant units)	31
A.3.9	Operator interface	31
A.3.10	Engineering workstation functionality	31
A.3.11	User management	32
A.3.12	Network and system security	32
A.3.13	Test I/O to the operator display	32
A.3.14	Complete I/O tests	33
A.3.15	Bus interfaces	33
A.3.16	Intelligent field devices	33
A.3.17	FAT open item	33
A.3.18	Test of communication links to subsystems	34
A.3.19	Application programming	34
A.3.20	Check of other system functions	34
A.4	Develop a test schedule	35
A.5	FAT certificate	35
Annex B (informative)	Site acceptance testing checklist	36
B.1	General	36
B.2	Develop a written test plan and specification	36
B.2.1	General	36
B.2.2	Documentation	36
B.2.3	Hardware/software inventory	36
B.2.4	Mechanical inspection	36
B.2.5	Wiring and terminal inspection	37
B.2.6	System energization	37
B.2.7	Hardware redundancy and diagnostics	37
B.2.8	Operator interface	37
B.2.9	Network and system security	37
B.2.10	I/O test	37
B.2.11	Bus interfaces	37
B.2.12	Intelligent field devices	37
B.2.13	Application programming	38
B.3	Develop a test schedule	38
B.4	SAT certificate	38
Annex C (informative)	Site integration testing checklist	39
C.1	General	39
C.2	Develop a written test plan and specification	39
C.2.1	General	39
C.2.2	Documentation	39
C.2.3	Visual inspection	39
C.2.4	Communications	39
C.2.5	Operator interface	39
C.2.6	Hardwired I/O	40
C.2.7	Functionality	40

C.3 Develop a test schedule 40

C.4 SIT certificate 40

Bibliography 41

Figure 1 – Project phases and E&I testing 14

Table A.1 – Test schedule 35

Table B.1 – Test schedule 38

Table C.1 – Test schedule 40

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**AUTOMATION SYSTEMS IN THE PROCESS INDUSTRY –
FACTORY ACCEPTANCE TEST (FAT), SITE ACCEPTANCE TEST (SAT),
AND SITE INTEGRATION TEST (SIT)**

FOREWORD

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IEC 62381 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

This third edition cancels and replaces the second edition published in 2012. This edition constitutes a technical revision.

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

- a) General re-organization of the standard;
- b) Current technology incorporated;
- c) Optional factory integration test (FIT) added;

- d) Replaced the forms in the annexes with detailed checklists of activities which can be used to develop project-specific test plans; and
- e) Provided additional references to other applicable standards.

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

Draft	Report on voting
65E/1080/FDIS	65E/1092/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

There is an increasing trend in the process industry to shorten the time period for project execution. At the same time, the complexity of automation systems is being increased due to the number of connected systems and the use of new technologies, for example, wired and wireless field sensor networks.

Experience has shown that the owner, the buyer and the vendor have long and extensive discussions to unambiguously establish the scope of activities and responsibilities in order to achieve timely delivery and acceptance of automation systems.

This document provides requirements and guidance on acceptance testing of control system installations, which can lead to a mutual understanding about the scope of activities of each party.

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AUTOMATION SYSTEMS IN THE PROCESS INDUSTRY – FACTORY ACCEPTANCE TEST (FAT), SITE ACCEPTANCE TEST (SAT), AND SITE INTEGRATION TEST (SIT)

1 Scope

1.1 General applicability

This International Standard defines requirements and checklists for the factory acceptance test (FAT), the factory integration test (FIT), the site acceptance test (SAT), and the site integration test (SIT). These tests are carried out to demonstrate that the automation system meets the requirements of the applicable specification.

This document provides a means for all parties, including the owner, the buyer, and the vendor, to clearly establish and agree on the scope of activities and responsibilities involved in performing these tests in order to achieve a timely delivery and acceptance of the automation system. The activities specified in this document can be used to develop test plans adapted to the specific requirements of the process/plant/equipment.

The annexes of this document contain checklists which are available for consideration when preparing specific test procedures and documentation for a specific automation system.

1.2 Exclusions

1.2.1 Prior- and post-test activities

Engineering and manufacturing activities prior to or after the FAT, FIT, SAT and SIT, such as loop checks and commissioning, are not covered by this document.

1.2.2 Regulated industries

For applications in the pharmaceutical or other highly specialized industries, additional guidelines (for example, good automated manufacturing practice (GAMP)), definitions and stipulations apply in accordance with other applicable existing standards.

1.2.3 Safety instrumented systems

The user can utilize this document to develop necessary testing for basic checks of a safety system, however, this document does not cover validation of a safety system. IEC 61511 provides requirements for checks and validation of safety instrumented systems.

1.2.4 Manufacturing execution systems

Testing and verification of manufacturing execution systems (MES) is not covered by this document.

1.2.5 Advanced process control

Testing and verification of advanced process control (APC) is not covered by this document.

1.2.6 Security for industrial automation and control systems

Although this document includes a limited number of network checks, it does not cover complete network and system security. IEC 62443 provides requirements for automation and control systems cyber security.

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 62382, *Control systems in the process industry – Electrical and instrumentation loop check*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1.1

advanced process control

APC

several tools and techniques whose common characteristic is taking process automation beyond the limits of single-loop control

Note 1 to entry: APC includes model-based software that is used to direct the process operation and is commonly referred to as multivariable predictive control or model predictive control.

3.1.2

automation system

complete system for the monitoring and control of production facilities

Note 1 to entry: An automation system can include a BPCS and can also include a SIS and other subsystems.

3.1.3

basic process control system

BPCS

system which responds to input signals from the process, its associated equipment, other programmable systems and/or operators and generates output signals causing the process and its associated equipment to operate in the desired manner but which does not perform any SIF

Note 1 to entry: A BPCS includes all of the devices necessary to ensure that the process operates in the desired manner.

Note 2 to entry: A BPCS typically can implement various functions such as process control functions, monitoring, and alarms.

[SOURCE: IEC 61511-1:2016, 3.2.3]

3.1.4

buyer

company purchasing the equipment or control system from the vendor

Note 1 to entry: The buyer can be the owner of the equipment or control system, or the buyer can be another company.