

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

The European Standard EN 62381:2007 has the status of a
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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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**Automation systems in the process industry -
Factory acceptance test (FAT), site acceptance test (SAT)
and site integration test (SIT)
(IEC 62381:2006)**

Systèmes d'automatisme
dans les industries de processus -
Essais d'acceptation en usine,
essais d'acceptation sur site
et essais d'intégration sur site
(CEI 62381:2006)

Automatisierungssysteme
in der Prozessindustrie -
Werksabnahme (FAT),
Abnahme der installierten Anlage (SAT)
und Integrationstest (SIT)
(IEC 62381:2006)

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CENELEC

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

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Foreword

The text of document 65/385/FDIS, future edition 1 of IEC 62381, prepared by IEC TC 65, Industrial-process measurement and control, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62381 on 2007-02-01.

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with the EN have to be withdrawn (dow) 2010-02-01

Endorsement notice

The text of the International Standard IEC 62381:2006 was approved by CENELEC as a European Standard without any modification.

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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, fieldbus systems.

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

This standard should lead to an improvement and acceleration of the negotiation phase and to a mutual understanding about the scope of activities of each party

The annexes of this standard contain forms which may be used in the test procedures. Buyers of this standard may copy these forms for their own purposes only in the required amount.

For application in the pharmaceutical or other highly specialized industries, additional guidelines (for example, Good Automated Manufacturing Practice (GAMP)), definitions and stipulations should apply in accordance with existing standards, for example, for GMP Compliance 21 CFR (FDA) and the Standard Operating Procedure of the European Medicines Agency (SOP/INSP/2003).

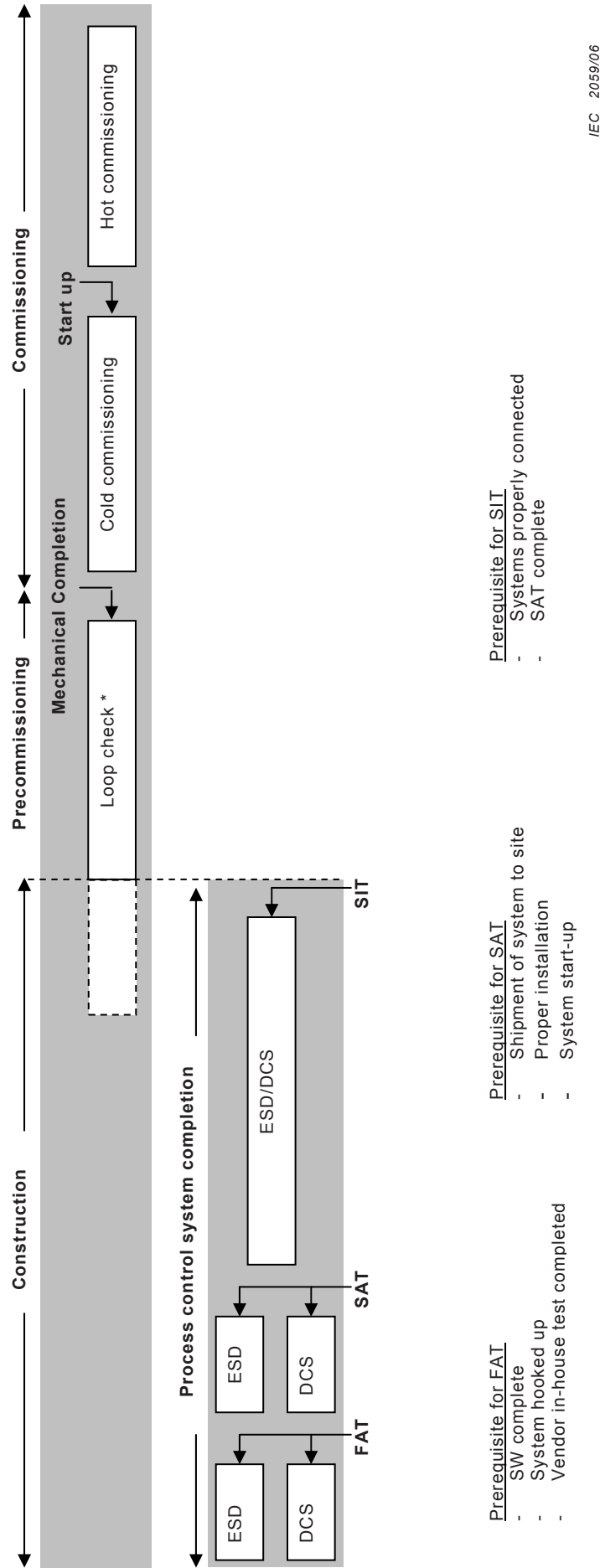
AUTOMATION SYSTEMS IN THE PROCESS INDUSTRY – FACTORY ACCEPTANCE TEST (FAT), SITE ACCEPTANCE TEST (SAT), AND SITE INTEGRATION TEST (SIT)

1 Scope

This International Standard defines procedures and specifications for the Factory Acceptance Test (FAT), the Site Acceptance Test (SAT), and the Site Integration Test (SIT). These tests are carried out to prove that the automation system is in accordance with the specification.

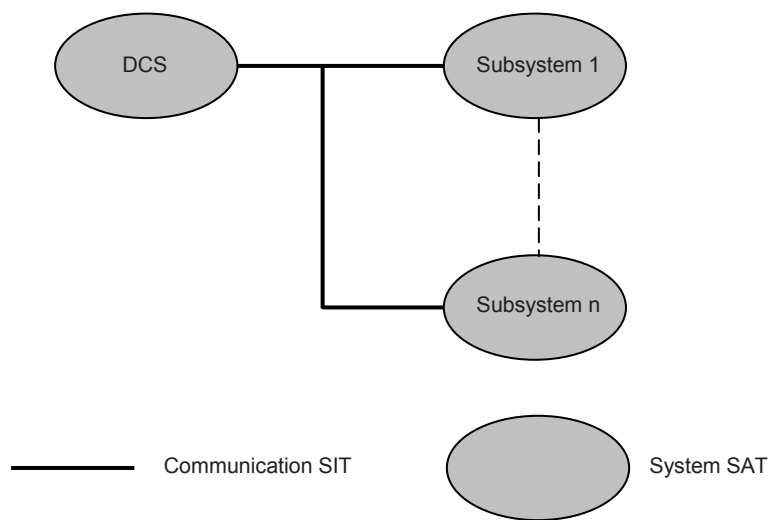
Engineering and manufacturing activities prior to these tests are not covered by this standard.

The description of activities described in this standard can be taken as a guideline and adapted to the specific requirements of the process/plant/equipment. A typical sequence of activities and events is shown in Figure 1, their relationship in Figures 2 and 3.



*The loop check can actually be started during the construction phase once the required infrastructure has been installed

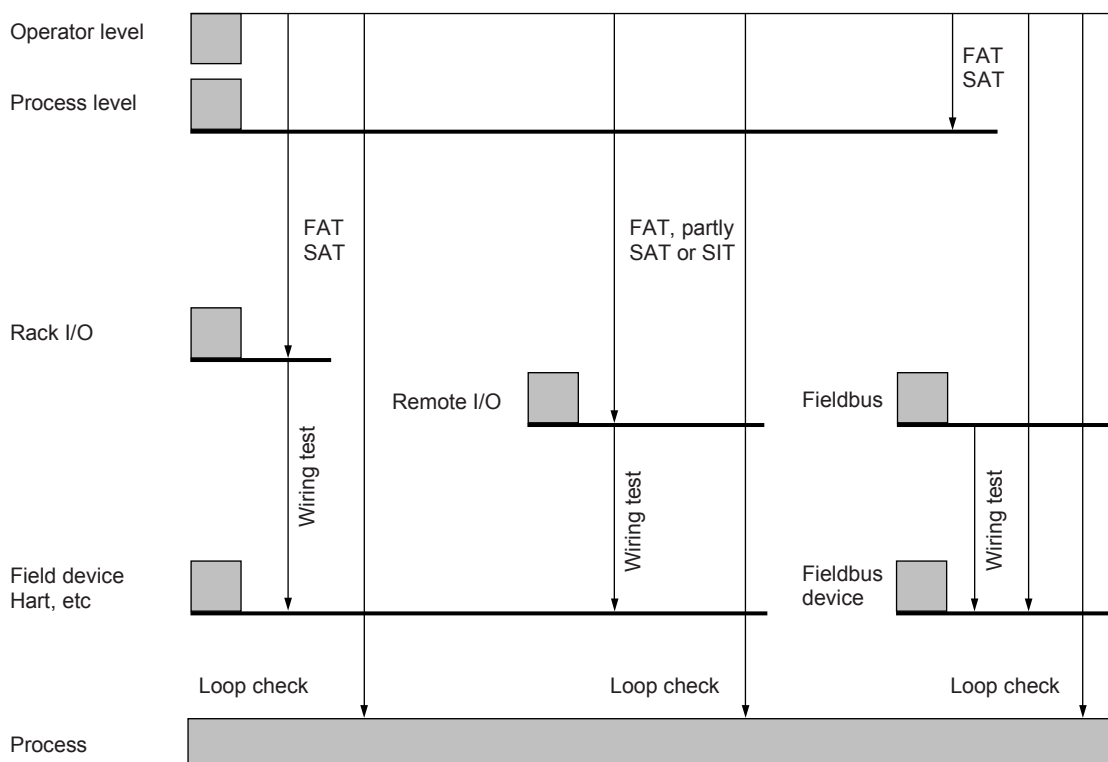
Figure 1 – Diagram depicting typical sequence of events for FAT, SAT and SIT with respect to the project milestones



IEC 2060/06

Figure 2 – Diagram depicting the relationship for the SAT and SIT between the DCS and subsystems

Typical DCS



IEC 2061/06

Figure 3 – Diagram depicting the relationship between the FAT, SAT and SIT with the relevant plant levels

2 Terms and definitions

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

2.1

automation system

DCS- or PLC-based system for the monitoring and controlling of production facilities in the process industry, including control systems based on fieldbus technologies

2.2

tag

unambiguous alphanumerical descriptor which identifies a sensor or actuator

2.3

factory acceptance test

activity to demonstrate that the vendor system and additionally supplied systems are in accordance with the specification

2.4

site acceptance test

activity to demonstrate that the installation of the various vendor systems are in accordance with the applicable specifications and installation instructions

2.5

site integration test

activity to demonstrate that the merging of the various systems to one overall system is completed and that all components work together as specified

2.6

buyer

company which is functionally responsible for the automation system purchased from vendor, i.e. either the owner or the contractor

2.7

owner

company that hired a contractor to build a chemical plant, petrochemical plant, etc.

2.8

contractor

company which is hired by the owner to design and build a chemical plant, petrochemical plant, etc.

NOTE The function of contractor can be fulfilled by the owner.

2.9

vendor

manufacturer or distributor of the automation system.

2.10

process industry

industry that uses chemical reactions, separations, or mixing techniques in order to create new products, modify existing products or treat waste and includes the following types of industries: chemical, petrochemical, waste treatment, paper, cement, etc. It does not include such industries as equipment/machine manufacturing or other similar industries. Industries which are subject to special requirements and or validation, etc. are also not included

2.11

project design specification

PDS

document that defines detailed information needed to implement the functionality described in the PFS

2.12

project functional specification

PFS

document that contains the vendor's response to the requirements the buyer stipulated prior to starting the project with the vendor

3 Abbreviations

C&E	Cause and effect diagram
DCS	Distributed control system
ESD	Emergency shut-down system
FAT	Factory acceptance testing
FBD	Functional block diagram
FUP	Function plan
HMI	Human machine interface
HW	Hardware

MC	Mechanical completion
PDS	Project design specifications
PFS	Project functional specification
PLC	Programmable logic controller
SAT	Site acceptance test
SIT	Site integration test
SW	Software

4 General preparation before conducting the FAT

Prior to commencing the FAT, the vendor shall complete full in-house testing. Test reports shall be available for inspection.

All relevant documents shall be prepared for use during the FAT. The following list shows documents typically used. The list should be adapted to be specific project.

4.1 Documents typically prepared by OWNER/CONTRACTOR

- Specifications
- Preceding agreement(s)
- Function plans
- Cause and effect diagrams
- Sequential functional charts
- Sketches of operator displays and relevant text
- Control narratives
- Instrument index, for example, TAG – service text – I/O type – scaling – units
- Alarm message list, for example, TAG – type of alarm – sorting criteria (priority, plant area)
- Setpoint, control, effect and safety directions
- Interlock list, for example, interlocks assigned to each sensor/actuator, software (DCS) and hardware (ESD)

4.2 Documents typically prepared by vendor

- System documentation
- Manuals, system data sheets, certificates
- System layout
- Hardware layout
- Description of interfaces
- I/O list and tag name conventions
- Graphic printouts
- Configuration printout
- In-house test reports
- Loop typicals (hardware and software) list of deliveries (hardware, software, application and licenses)
- Test plan