IEC/PAS 62337

Edition 1.0
2002-08

Milestones and activities during commissioning of electrical instrumentation and control systems in the process industry

PUBLICLY AVAILABLE SPECIFICATION

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FOREWORD

A PAS is a technical specification not fulfilling the requirements for a standard, but made available to the public.

IEC-PAS 62337 has been prepared by IEC technical committee 65: Industrial-process measurement and control.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document:

Draft PAS	Report on voting
65/291/PAS	65/300/RVD

Following publication of this PAS, the technical committee or subcommittee concerned will investigate the possibility of transforming the PAS into an International Standard.

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This PAS shall remain valid for no longer than 3 years starting from 2002-09. The validity may be extended for a single 3-year period, following which it shall be revised to become another type of normative document, or shall be withdrawn.

INTRODUCTION

There is an increasing trend in the process industry to award the construction of total plants to contractors on a lump-sum turnkey or similar commercial basis. Experience has shown that both the process industry (hereafter called owner) and the contractor have long and expensive discussion to lay down unambiguously the scope of activities to be taken by the contractor and the owner and their responsibilities to achieve the hand over of the plant.

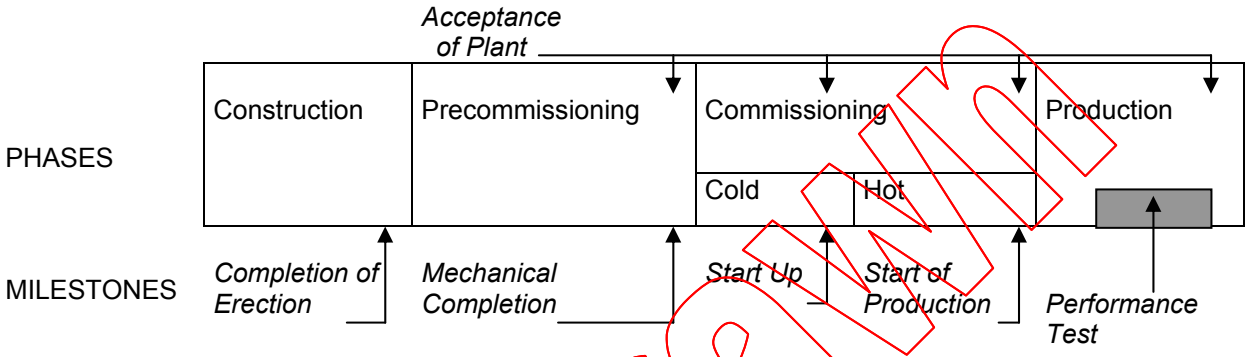
This document should lead to an improvement and acceleration of the negotiation phase and to a mutual understanding about the scope of activities of each party.

This document does not reflect the interests of the pharmaceutical industry or other highly specialized industries.

MILESTONES AND ACTIVITIES DURING COMMISSIONING OF ELECTRICAL INSTRUMENTATION AND CONTROL SYSTEMS IN THE PROCESS INDUSTRY

1 Scope

This document defines phases and milestones (see figure 1) and describes as an ***example*** activities after the "Completion of Erection" milestone of the project and prior to the Acceptance of Plant by the owner. For each type of process/plant the activities shall be adapted.



NOTE Construction and Precommissioning activities could be overlapping.

Figure 1 – Definition of phases and milestones

2 Definitions

For the purposes of this document the following definitions apply.

2.1
precommissioning
phase, during which the activities of non-operating adjustments, cold alignment checks, cleaning, and testing of machinery take place. Refer to Annex B for the detailed activities.

2.2
mechanical completion
milestone, which is achieved („Mechanically Complete'') when the plant, or any part thereof, has been erected and tested in accordance with drawings, specifications, instructions, and applicable codes and regulations to the extent necessary to permit cold commissioning. This includes completion of all necessary electrical and instrumentation work. This is a milestone marking the end of the precommissioning activities.

2.3
cold commissioning
phase, during which the activities associated with the testing and operation of equipment or facilities using test media such as water or inert substances prior to introducing any chemical in the system take place.

2.4
start Up
milestone marking the end of Cold Commissioning. At this stage the operating range of every instrument loops shall already be adjusted to reflect the actual working condition.

2.5
hot commissioning
phase, during which the activities associated with the testing and operation of equipment or facilities using the actual process chemical prior to making an actual production run take place.

2.6
start of production
milestone marking the end of Hot Commissioning. At this stage the Plant is ready for full and continuous operation.

2.7
performance test
milestone at which time the Owner's personnel run the production plant, with the help and supervision of the contractor, to its design capacity. This test is to demonstrate the Contractor's Process Performance and Consumption Guarantees as specified in the contract.

2.8
acceptance of plant
milestone in which the formal turn over of the plant from the contractor to the owner is carried out. At this time the contractor is relieved from any obligation, with exception to defect liability and any other outstanding obligations which are part of the contract. The owner resumes full responsibility in running and maintaining the plant.

2.9
owner
company that hired a contractor to build a chemical plant, petrochemical plant, etc.

2.10
contractor
company which is hired by the owner to design and build a chemical plant, petrochemical plant, etc. This company is responsible for all activities as described in a separate contract including e.g. the engineering design, procurement, erection of the plant as well as the implementation of all tests and acceptance that are necessary to deliver a serviceable plant. This company may also be responsible in training the owner's production as well as maintenance personnel on plant operation.

2.11
licenser
company or individual that has a process know how which willingly provides the owner with the technology to be used in the construction, operation and maintenance of a chemical plant, petrochemical plant, etc., or part of the process in such a plant.

2.12
vendor
manufacturer or distributor of a piece of equipment/instrument/package unit. The vendor should be the expert for the proper installation as well as the operation of the equipment/instrument/package unit.

2.13
process Industry
refers to 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 and does not include pharmaceutical or other highly specialized industry.

3 Recommendations for the usage of this document

This document assumes that the "Acceptance of Plant" milestone will occur after the Performance Test. If this is not the case, this document should be adapted accordingly.

4 General preparations before acceptance of plant

The following items shall be completed in accordance with the responsibilities as defined within the Contract:

a) Documents

The agreed upon documents pursuant to Annex A, clause A.1 shall be issued by contractor to owner.

b) Manpower Mobilization Plan

The agreed upon amount of manpower required both from the owner as well as from the contractor including their qualification and their availability shall be available. The organization of personnel during Precommissioning, Commissioning and Performance test shall be established.

c) Equipment and Tools

The agreed upon required tools and equipment to be supplied by the Owner or the Contractor shall be available.

d) Raw Materials and Utilities

For the agreed upon supply of the raw materials and utilities Contractor and Owner shall agree upon a detailed time schedule and the conditions for supply within a reasonable time period before Completion of Erection.

e) Catalysts and Consumables

For the agreed upon supply of required catalysts, lubricants, chemicals and other consumables Contractor and Owner shall agree upon a detailed time schedule and conditions within a reasonable time period before Completion of Erection.

5 Completion of erection

5.1 Mechanical checks and tests

After erection of the Plant, of each piece of equipment, facility or discrete part of the Plant, mechanical checks and tests shall be carried out by Contractor.

The mechanical checks and tests shall verify that:

a) The Plant is erected in accordance with the piping and instrument diagram, construction drawings and the Vendor's drawings.

b) The equipment installed and mechanically function in accordance with the project specifications; and

c) Applicable codes as listed in the project specifications are followed for materials and workmanship.

Items such as painting, thermal insulation and final clean up which would not affect the operation or safety of the Plant could be excluded. All these items shall be listed and completed after Precommissioning or Commissioning within a mutually agreed upon schedule between Contractor and Owner, but before the Acceptance of Plant.

5.2 Procedure

The following shall apply:

a) The Contractor shall prepare and maintain on site test forms and records which shall include the following information:

– Description of the type of test or check,

– Date and time of test or check,

– Identification of equipment and facilities,

– Test pressure if applicable, test data and results, including remarks, if any,

– Signature of the Owner's personnel wittnessing data recorded, if required.

b) Check, test and records thereof shall be carried out by the Contractor's personnel.

Wherever the Owner's witness or attesting for the check or test is required, the Owner's personnel shall attend such check and test. For this purpose, the Contractor shall keep the Owner informed of the day-to-day test plan schedule. The test plan schedule should be constantly revised to reflect the actual progress of the work and test.

c) Any items found incomplete or requiring repair or adjustment shall be marked as such on a separate punch list and reported by the Contractor to the Owner's and Contractor's personnel in charge of the relevant construction area. The test records for items in the punch list will be left blank, until the problem has been corrected.

d) The Contractor shall expedite and follow up the completion of all incomplete, repaired or adjusted work items in the punch list, and shall keep these expediting records up to date.

e) Checking procedures shall be repeated until all the items on the checklist are cleared.

f) At the completion of each test, the Owner shall certify on the test records indicating the test has been satisfactory, otherwise the Contractor shall repeat the tests. Upon the satisfactory completion of the re-test, re-certification by the Owner shall be made accordingly.

g) A complete set of test records shall be handed over to the Owner on completion and upon such date the Completion of Erection shall be considered as achieved.

6 Precommissioning (mechanical completion)

6.1 General

After Completion of Erection, Precommissioning activities listed in project defined in Annex B and final steps listed in 6.2 shall be carried out in accordance with the Contract to make the Plant mechanically complete and ready for Commissioning.

The documents to be utilized are listed in annex A.

6.2 Procedure

a) Contractor's personnel responsible forthe checks, tests and recording of results at Completion of Erection shall be responsible for the completion of any remaining work, adjustments and repairs of the equipment marked on the test records during Precommissioning and for the maintenance of appropriate records.

b) Contractor's personnel appointed for Commissioning should also participate in Precommissioning work to verify the satisfactory performance of the Plant.

c) During the checks and tests, the Contractor's personnel are responsible for training the Owner's personnel on the operation of the Plant, as defined within the contract.

d) The Owner or Contractor shall furnish operating and maintenance personnel, according to the Manpower Mobilization Plan, to perform those parts of Precommissioning work, which are agreed to be the Owner's responsibility in accordance with Annex D.

e) The Contractor shall ensure that his personnel work in close conjunction with the Owner's personnel by providing supervision and advice where necessary.

f) The Contractor shall prepare detailed procedures for each Precommissioning activity listed in Annex B. Procedures shall be updated or added by the Contractor as necessary to support any additional work.

g) Mechanical Completion shall be confirmed on each part/section/unit/facility of the Plant individually.

h) A detailed schedule for Precommissioning of each part/section/unit/facility shall be submitted by the Contractor to the Owner before Completion of Erection.

i) Upon completion of Precommissioning activities of each part/section/unit/facility of the Plant, the Contractor shall submit to the Owner a written Notice of Mechanical Completion, which shall include:

- Identity of a part/section/unit/facility of the Plant considered mechanically complete,
- A copy of all relevant completed test reports,
- The date on which the completion of the tests was achieved,
- Check list, and
- A request for acceptance of a Mechanical Completion Certificate in respect of that part/section/unit/ facility.

j) Within an agreed period from the date of receipt of the Contractor's written notice, the Owner shall:

- In the case of acceptance

  Sign the issued Mechanical Completion Certificate similar to the form given in Annex C or
- In the case of objection

  Submit a rejection statement setting forth-remaining items to be completed or defects or deficiencies to be corrected before the Mechanical Completion status can be accepted.

k) When the Owner rejects the Contractor's notice the Contractor shall take any necessary action to complete or correct the items marked and give the Owner a subsequent notice of Mechanical Completion.

l) The Owner shall sign either a Completion Certificate or shall issue a rejection statement within an agreed period of the date of any subsequent notice of Mechanical Completion.

m) Upon acceptance of the Mechanical Completion Certificate of the last part/section/unit/facility of the Plant by the Owner, the Owner shall within an agreed period accept the issued respective Mechanical Completion Certificate for the Plant similar to the form given in Annex C.

7 Commissioning

7.1 General

After the issuance by the Owner of a Mechanical Completion Certificate for a part/section/unit/facility of the Plant, Commissioning activities listed in 7.2 shall be carried out as far as possible to enable the Start Up and/or Start of Production.

The documents to be utilized are listed in Annex A.

7.2 Procedure

a) Commissioning shall be carried out in the following sequence:

- Warming up or cooling down
- Initial running using test media such as water or other inert substances,
- Operability adjustment,
- Feeding in,
- Stable operation,
- Loading up to the design capacity, and
- Final adjustment