

## COMMISSIONING

### INTRODUCTION

Commissioning is a systematic and progressive, quality-focused process of adjusting a system that is physically complete so that it performs as the principal intended. This involves putting the components of the system into operation, calibrating instruments and controls, adjusting and checking.

Virtually every building project requires commissioning to some extent, most notably in connection with fire and mechanical systems. Poor commissioning or no commissioning is a common cause of occupant complaints and can lead to adverse effects such as avoidable energy use and premature plant failure. In the case of fire systems, poor commissioning can result in systems that do not work properly in the event of a fire, endangering life and property.

NATSPEC uses SA TS 5342 as a basis for specifying commissioning. In the sense used by NATSPEC and SA TS 5342, commissioning is separate from, and occurs after, tests required to demonstrate that the quality of the physical work meets documented requirements. That is, it occurs after *static completion*. For example, leak tests on a chilled water system are tests for the quality of work while water balancing (adjusting the system so the right amount of water is supplied to a particular item) is commissioning.

In practice, the distinction between testing and commissioning can be a little blurred. Although commissioning is not a process aimed at identifying defects in construction it may well reveal them. Further, some standards use the term commissioning in a way that includes tests of constructed quality. In general, if a standard refers to something as commissioning, NATSPEC treats it as commissioning regardless of the distinction in SA TS 5342.

### FACTORS AFFECTING COMMISSIONING

#### Program planning

There are many factors affecting commissioning but by far the most significant is the project program. Unlike physical tasks such as pouring concrete and erecting ducts, commissioning produces nothing physical in the building, so compressing commissioning activities can produce the illusion that program has been met, only to result in defects and issues after completion that are frustrating to the principal and occupants, and expensive to contractors.

Of particular concern is the effect of program slippage caused by trades that are not involved in commissioning. If, for example, mechanical commissioning cannot be started because the ceiling contractor has not finished, the mechanical contractor may appear to be behind program, not the ceiling contractor.

The program should allow adequate time for commissioning activities making sure that prerequisite activities are completed on time. Timely project completion satisfies the principal and occupants and minimises expense to contractors. Conversely inadequate programming, or an adequate program that is not followed by the contractor or enforced by the contract administrator, will most likely lead to dissatisfaction all round. 0171 *General requirements* requires the contractor to prepare a commissioning program as part of the project program.

#### Other factors

Other factors affecting commissioning include:

- Integration of commissioning into the whole project. It is misleading to assume that only the obvious trades, such as mechanical services, require commissioning.
- Clear definition of acceptable commissioning outcomes including verifiable pass-fail criteria.
- Lack of clarity of the principal's project requirements, poor design and vague or incomplete specifications.
- Commissioning requires effective communication between all parties including communicating non-contractual matters such as design assumptions and the contractor's commissioning procedures.
- Potential tension between the party responsible for meeting project program targets and the commissioning manager.
- The principal's enforcement of commissioning responsibilities and program.
- Variations.
- Responsibilities during the defect's liability period.
- Statutory testing and inspections.
- Fitout work.



### Definitions

SA TS 5342 includes the following definitions:

#### Commissioning:

Advancement of an installation from static completion to full working order, including verification that the systems, sub-systems, and their components meet the project requirements.

#### Commissioning activity:

Any activity required within the commissioning process, including any procedure, test or demonstration to verify that the project requirements have been met.

#### Pre-commissioning:

Verifying that the installation of a system is complete and ready for commissioning.

Static completion: State of a system when installation works are complete.

### Relevant documents

AIRAH DA27 - *Building commissioning*

ASHRAE Guideline 0 - *The commissioning process*

CIBSE Commissioning

Code M: *Commissioning management*.

SA TS 5342 *Technical specification for building commissioning*

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### SA TS 5342 COMPARED TO OTHER COMMISSIONING GUIDELINES

SA TS 5342 only addresses what needs to be done as part of commissioning, not who is to do it. In this it differs significantly from other commissioning guidelines. For example, ASHRAE Guideline 0 is dependent on there being a Commissioning Authority (CxA), while CIBSE Commissioning Code M is written around a Commissioning Manager.

This approach offers considerable flexibility since SA TS 5342 can be applied, at least in part, to all projects regardless of size and is not dependent on the existence of a specialist commissioning consultant appointed by the principal.

Since SA TS 5342 does not allocate tasks to parties, it provides an informative Appendix B with a suggested way to present commissioning roles and responsibilities keyed to SA TS 5342 clause numbers. If the principal engages a commissioning manager, this matrix (or equivalent) would normally be prepared before tendering in conjunction with the commissioning manager and included with *0164 Commissioning*.

### NATSPEC'S APPROACH

#### **0171 General requirements**

Since virtually every project involves commissioning, the bulk of general commissioning requirements are in *0171 General requirements*. These include testing equipment and calibration, commissioning planning, preparation of a commissioning program, procedures and methodology, integrated system tests, training, and operation and maintenance manuals. It also includes clarification of the meaning of static completion (defined in SA TS 5342).

If the principal does not appoint a commissioning manager, the default text in *0171 General requirements* can be used to cover commissioning requirements normally provided by the contractor (or trade subcontractors).

If there is no commissioning manager appointed by the principal, the commissioning manager's roles and responsibilities must be performed by the contractor. For full SA TS 5342 compliance, this matrix or its equivalent must be provided in the commissioning plan required under **COMMISSIONING**, **Commissioning plan** in *0171 General requirements*.

#### **0164 Commissioning**

This worksection is only required if the principal appoints a commissioning manager as an independent consultant under SA TS 5342. If one is to be appointed, the appointment should occur as early as possible in the project program so the commissioning manager can provide input into the design.

If *0164 Commissioning* is used, the principal must prepare a document allocating roles and responsibilities under SA TS 5342, which assists in this by providing a framework in Appendix B. The worksection also has provision for referencing other documents relating to commissioning such as the consultants' basis of design.

#### **Other worksections**

If commissioning is required, it is specified in the respective worksection. For example, commissioning of sprinkler systems is specified in *1033 Sprinklers*.

The only exception to this is mechanical services where commissioning spans multiple worksections and so it is covered in a dedicated worksection, *0791 Mechanical commissioning*.

Worksections with commissioning requirements can be identified by searching NATSPEC for clauses headed **COMMISSIONING**.