



PRO2.3

# Systematic commissioning

## Objective

Our objective is to quickly hand over the completed building and ensure its systematic operation, so all its features/attributes will work as initially designed.

## Benefits

Systematic commissioning ensures that the planned features/attributes of the building are implemented. This minimises risks and is a relevant component of efficient use of energy sources.

## Contribution to overriding sustainability goals



CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS (SDGS) OF THE UNITED NATIONS (UN)

CONTRIBUTION TO THE GERMAN SUSTAINABILITY STRATEGY

	CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS (SDGS) OF THE UNITED NATIONS (UN)	CONTRIBUTION TO THE GERMAN SUSTAINABILITY STRATEGY
<b>1</b> Low	7.3 Energy efficiency	7.1.a/b Resource conservation
	12.2 Use of natural resources	



## Outlook

There are no plans to make any of the requirements stricter. Ideally, this criterion can be omitted entirely in a few years, once the aspects of the criterion have become standard.

## Share of total score

	SHARE	WEIGHTING FACTOR
Office		
Education		
Residential		
Hotel	1.6%	3
Consumer market		
Shopping centre		
Business premises		
Logistics		
Production		

---



## EVALUATION

Indicators 1 to 5 evaluate the extent to which systematic commissioning of the completed building has been prepared and documented. Training provided for the operator, including handover of an operating concept for continuous monitoring, is evaluated in indicator 6. Indicator 7 awards additional points for readjustment after an initial operating phase. This evaluation takes into account at least the following technical components: Heating system, ventilation, room air conditioning, cooling technology, building automation, lighting, hot water supply, façade shutters. In this criterion, a maximum of 100 points can be awarded.

NO.	INDICATOR	POINTS
<b>1</b>	<b>Monitoring concept</b>	
1.1	Creation of a monitoring concept Creation of a suitable monitoring concept for recording energy and water consumption	<b>15</b>
<b>2</b>	<b>Commissioning concept</b>	
2.1	Creation of a commissioning concept for scheduling Creation of a commissioning concept including scheduling	<b>10</b>
<b>3</b>	<b>Preliminary function test</b>	
3.1	Performance of a preliminary function test Preliminary function test of the components performed and results documented	<b>10</b>
<b>4</b>	<b>Function test and training</b>	
4.1	<b>Performance and documentation</b> of a function test and training for the operator Function test performed and results documented, and training provided for the operator	<b>15</b>
<b>5</b>	<b>Final report on commissioning</b>	
5.1	Creation of a detailed final report Creation of a detailed final report for commissioning	<b>20</b>
<b>6</b>	<b>Integral operating concept and systematic commissioning</b>	
6.1	Creation and handover of an integral operating concept Creation and handover of an integral operating concept as part of a process of continuous monitoring and regulating as well as training provided for the operator	<b>20</b>



---

**7 Commissioning management**

- 7.1 Readjustment of the system following initial operating phase **10**  
Commissioning of a specialist planner or an (independent) third party for continued regulating, for the first time approximately 10–14 months following completion

---

Re 3–5 **INNOVATION AREA**



As in  
3–5

Explanation: Methods that provide equivalent results in terms of the preliminary tests, function tests, training and reports can be permitted here in addition or as alternatives.

---



# SUSTAINABILITY REPORTING AND SYNERGIES

## Sustainability reporting

–

NO.	KEY PERFORMANCE INDICATORS (KPIs)	UNIT
<hr/>		
<hr/>		

## Synergies with DGNB system applications

- **DGNB OPERATION:** The results of indicator 1 can to some extent be used in criterion ENV9.1 of the Buildings in use scheme.
- **DGNB INTERIORS:** The results of indicator 1 can to some extent be used in criterion PRO8.1, indicator 1.2 of the Interiors scheme.
- **DGNB RENOVATED BUILDINGS:** The results of the indicators can to some extent be used in criterion PRO2.3.
- **DGNB DISTRICTS:** There are synergies with the criteria PRO1.8 and PRO3.5 in the UD and BD schemes.



## APPENDIX A – DETAILED DESCRIPTION

### I. Relevance

In a well-planned commissioning the individual components of the building services system are coordinated and adjusted following the approval. Within the framework of operational optimisation the system should be readjusted once again after an initial running time of 10 to 14 months.

The well-planned commissioning requires a concept for adjustment and readjustment. As this concept does not involve a standard service following HOAI (German Fee Structure for Architects and Engineers) it must be secured contractually. It must be carried out by a specialist company and recorded. In addition to the verification of the adjustment, the documentation must also contain information on significant pre-settings of the system so that inappropriate changes by the user can be reversed.

### II. Additional explanation

–

### III. Method

#### Indicator 1: Monitoring concept

An appropriate monitoring concept has been implemented for the building, which at minimum enables all energy and water consumption to be regularly (on a monthly basis) and completely recorded.

#### Indicator 2: Commissioning concept

An appropriate commissioning concept has been created for the building. It describes all essential elements of the commissioning process, including scheduling.

#### Indicator 3: Preliminary function test

**All essential technical components have demonstrably undergone a preliminary function test. Appropriate documentation of this is available.**

#### Indicator 4: Function test and training

All essential technical components have demonstrably undergone a function test. Appropriate documentation is available, enabling future operators to understand the test results. The operator has been appropriately briefed.

#### Indicator 5: Final report on commissioning

A complete final report for the commissioning of the building is available.

#### Indicator 6: Integral operating concept and systematic commissioning

An integral operating concept has been transformed into a process of continuous monitoring and regulating. The operator has been appropriately briefed regarding the integral operating concept.



### **Indicator 7: Commissioning management**

The contractually agreed service descriptions regarding commissioning management form the basis for review of the systematic commissioning. Commissioning management requires comprehensive service descriptions for a structured approach, documentation of the services and documentation of acceptance, commissioning and optimisation during building operation.

Service description for commissioning management:

#### **1. General services**

The services required for commissioning management are significantly more comprehensive than those involved in the acceptance and commissioning procedures normally used up to now in Germany, and begin as early as in the planning phase. These services relate to a structured approach, performance documentation and documentation of acceptance, commissioning and optimisation during building operation.

Commissioning management must be carried out by a (where applicable, independent) body (commissioning authority, e.g. an engineering office not involved in the planning and implementation of the project), which can consist of one or more persons. For the objectives of this indicator, the (where applicable, independent) body must be involved in the project with the exception of the planning and implementation tasks.

The professional expertise of the (where applicable, independent) body must be documented via definitive references (at least two projects) provided by a project manager/company regarding provision of comparable services.

In accordance with the described requirements and conditions, the (where applicable, independent) body provides the services described below.

#### **2. HOAI-3: Establishing the basis**

Establishment of the organisation:

- Integration into the complete project team including induction
- Coordination meetings with the client
- Organisation of the commissioning activities
- Setting up the commissioning team

Creation of a commissioning plan:

- Objectives of commissioning
- Tasks and activities in the commissioning process
- Scope of installations and systems in the commissioning process
- Responsibilities within the commissioning team
- Planning basis:
  - Comfort parameters
  - Technical parameters
  - Boundary conditions
- Deadlines and processes

**Integration of the specifications into the commissioning plan (see criterion PRO 1.1 Comprehensive project**



#### **brief – HOAI 1+2):**

Summary of the building owner's requirements and project objectives on the basis of the previous specifications and integration into the process:

- Building owner and user requirements
- Cross-system project objectives
- Flexibility, quality, costs
- Environment and sustainability
- Energy objectives for compliance
- Comfort and technical boundary conditions
- System description of the technical installations
- Concept for the building operation
- Description of the future use

Each describing clear objectives and measurable success criteria (e.g. temperatures, consumption, etc.).

### **3. HOAI 5+6: Assessment of planning and invitation to tender**

#### **Design review in the detailed design phase:**

Support for the detailed design process with regard to relevant issues concerning commissioning, such as:

- Defining system requirements resulting from commissioning
- Processes appropriate for commissioning in planning and implementation
- Requirements regarding measuring equipment with regard to documentation for commissioning and later building operation (recommissioning)
- Accessibility for commissioning

Plausibility check and instructions for expanding the overall operating concept with regard to optimised operation of the installations and systems relevant to commissioning, including instructions for creating a supplementary operational description with regard to the aspects of performance measurements, functional documentation and optimised system operation during the operating phase.

#### **Invitation to tender for the commissioning:**

Definition of the requirements for commissioning and briefing regarding the relevant service texts in the tender documents.

### **4. HOAI 8+9: Construction and acceptance**

#### **Preliminary function test (see indicator 3):**

Creation of checklists and test reports as a requirement regarding the commissioning and acceptance process for the company contracted to provide the services.

- The checklists and test reports contain the required results after commissioning has been carried out by the contracted companies, as well as, for example, performance documentation and measured values for factory acceptance of the major components (e.g. cooling system, lighting, etc.).
- The checklists must be completed by the contracted company and must be checked by commissioning management to ensure completeness and plausibility.
- Ensuring that all required tests have been documented via reports and checklists as a requirement for the subsequent function and performance tests.



#### **Function test (see indicator 4):**

- Creation of a process concept for the function and performance tests to be carried out on the various systems under the various operating conditions and dependencies (such as full load operation, emergency operation, etc.).
- Coordination and monitoring of the function tests in close cooperation with the contracted companies and specialist planners.
- Recording of the results
- As part of the preparations for the function and performance tests, coordination meetings with the contracted companies and designers must be carried out at an early stage and documented via results logs.

#### **Documentation (see indicator 5):**

- Creation of a final report once the entire commissioning and acceptance process has been completed, including a summary of the tests and work processes carried out, documentation of the set objectives and a list of outstanding issues that need to be dealt with at the start of the building operating phase.

### **5. Building use and operating phase**

#### **Readjustment (recommissioning):**

- Creation of a concept in cooperation with the building owner and facility manager for reviewing and documenting the system target values in a period of 10–14 months after the start of building use.
- List of defects and remaining tasks established during test operation as a basis for corrective measures by the contracted companies.

Collaboration for optimisation measures during the initial building operating phase following evaluation of the measurement results for achievement of objectives in accordance with the requirements resulting from commissioning. List of required measures and recommendations for optimal system operation in the use phase of the building.



## APPENDIX B – DOCUMENTATION

### I. Required documentation

A range of different forms of documentation is listed below. The documentation submitted must comprehensively and clearly demonstrate compliance with the requirements for the target evaluation of the individual indicators.

- Commissioning plan including measurable objectives with regard to consumption, temperatures, etc., and a formulated concept for complete documentation of the regulating and readjustment processes
- Excerpts from the commissioning reports and contract documents with an independent body for carrying out commissioning management
- Handover certificates or process concept for completed preliminary function tests
- Handover certificates or process concept for completed function tests
- List of completed function tests and associated reports (for all systems such as heating systems, ventilation, façade shutters, etc.) with results
- Formulated concept for transforming commissioning into a process of continuous monitoring and optimisation
- Excerpt of the contract regarding optimisation of the building technology within the first 14 months

Unlike the function test carried out solely for the acceptance process, the commissioning management must be carried out by an external third party. The company contracted to carry out the tests (independent third party) must not:

- Be one of the companies involved in construction of the building technology systems ("contracted companies") or
- Be one of the companies contracted to carry out commissioning, regulating or operational optimisation (architect, building technology designer).



## APPENDIX C – LITERATURE

### I. Version

#### Change log based on version 2018

PAGE	EXPLANATION	DATE
------	-------------	------

---

### II. Literature

- DIN 18380. German construction contract procedures (VOB) – Part C: General technical specifications in construction contracts (ATV) – Installation of central heating systems and hot water supply systems. Berlin: Beuth Verlag, April 2010
- VDI 6039. Managing of building commissioning – Methods and procedures for building-services installations. Düsseldorf: Verein Deutscher Ingenieure e.V. June 2011