

**MRC LABORATORY OF MOLECULAR BIOLOGY
NEW IT ROOM IS001
CAMBRIDGE
SPECIFICATION – VOLUME 07
DUTIES FOR COMMISSIONING SPECIALIST**

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CONTENTS

C.1 GENERAL

C.2 CODES USED

C.3 DUTIES

C.4 ENGINEERING SERVICES COMMISSIONING COMMUNICATIONS FLOW DIAGRAM

C.1 GENERAL

All Work Package Contractors shall be responsible under the jurisdiction of the Main Contractor to fully commission the Building plant and systems included within their works.

A Commissioning Specialist shall be appointed by the Main Contractor to technically monitor, witness and report on all commissioning related activities from design, through installation to final commissioning.

The testing and commissioning elements of the following works shall be monitored and witnessed by the Commissioning Specialist:

- Mechanical Services Installations
- Plumbing Installation
- BMS Installation
- Electrical Installation
- UPS Installation
- Life Safety Installations
- Data Installation

The Specialist shall also attend the training of the Employers Staff in the operation and maintenance of all Building Services aspects of the project.

This document should be read in conjunction with the Main Prelims document relating to requirements to be undertaken by the Commissioning Specialist.

Complex Systems

A Specialist Commissioning Manager shall be appointed by either the Contractor for complex systems such as:

- Building management system (BMS)

The specialist commissioning managers scope of their responsibility shall include:

- Design input: commission ability design reviews
- Commissioning management input to construction programming
- Commissioning management input during installation stages
- Management of commissioning, performance testing and handover/post-handover stages

C.2 CODES USED

The following Publications shall apply in the context of the Commissioning Specialist compliance monitoring and reporting:

CIBSE Commissioning Codes

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- Series C - Automatic Controls
- Series W - Water Distribution
- Series M - Management

BSRIA Application Guides

- 20/95 - Commissioning of Pipework Systems
- 2/89 - Water Systems
- 8/91 - Pre-Commission Cleaning of Water System

- 1/2001.1 - Pre-commission Cleaning of Pipework Systems.
- AH/92 - Commissioning of BEMS - A Code of Practice
- 2/93 - Water Treatment for Building Services Systems
- 5/2002 - Commissioning Management

BSRIA Technical Memorandum

Others

- Institution of Electrical Engineers Regulations for Electrical Installations (17th Edition)
- Manufacturers Recommendations

C.3 DUTIES

The duties below should be read in conjunction with the Main Prelims document relating to requirements to be undertaken by the Commissioning Specialist.

C.3.1 Buildability Review

The Commissioning Specialist will review all Design Drawings and all Work Package Contractor developed Fabrication and Installation Drawings when they become available and check that all flushing, cleaning and sterilisation, testing, balancing, measurement and commissioning facilities have been provided for and are in suitable positions within systems and on plant

If a problem is identified, the Commissioning Specialist shall advise the Project Manager and request a formal response to the query within a specified timescale

The Commissioning Specialist thereafter shall check that any agreed actions are incorporated in the works

The Commissioning Specialist shall check that all control equipment is in accordance with the Specification requirements and is located in the correct position

All comments on drawings and documentation shall be made in sufficient time to allow the adoption and implementation of any works without disruption to the project programme

C.3.2 Commissioning Programme

The Commissioning Specialist shall review the Contractors detailed programme for all commissioning and testing activities.

In reviewing the programme the Commissioning Specialist shall specifically check the:

- The workability and achievability of the programme
- Adequate allowance for the witnessing activity in the programme
- Implications of the commissioning and testing activities on the works of other trades
- The required state of completion of the building works and finishes for commissioning to commence
- Access requirements
- Limitations at any time on access by other trades to areas under test.

The Commissioning Specialist shall at all stages of the works monitor the performance of the respective

Work Package Contractors against the agreed programme and advise the Project Manager of the rate of progress, together with observations or suggested remedies if the progress fails to accord with the programme.

The Commissioning Specialist shall be required to attend regular meetings with the Contractor and the respective Work Package Contractors to review progress against the programme.

The Commissioning Specialist shall produce regular progress monitoring reports.

The Commissioning Specialist shall be responsible for checking any necessary updating of the commissioning programme including the effects of changes to the works or specified equipment.

C.3.3 Installation Works

The Commissioning Specialist shall monitor the progress of the installation works, including any changes to the works or specified equipment and shall be responsible for checking that sufficient test points are provided and that the installation of regulating devices, whether manual or automatic, is in accordance with manufacturers' recommendations and good practice.

The Commissioning Specialist shall check that the installation works comply with the accepted status drawings especially with regard to items affecting commissioning.

C.3.4 Progress Monitoring and Programme Review

The Commissioning Specialist shall supply a copy of a monthly report and programme review which will reflect the up-to-date situation of the commissioning works. Any delays emanating from any source will be immediately brought to the attention of the Project Manager. The precise timing and format of the monthly report and programme review will be agreed with the Project Manager.

The review and reporting period one month subsequent to the start of final commissioning shall be on a weekly basis.

C.3.5 Monitoring and Witnessing Pre-Commissioning Checks

The Commissioning Specialist shall monitor and witness the Work Package Contractors activities to check compliance with specified requirements, agreed method statements and procedures, to enable systems to be released for commissioning.

Checks shall include:

- Flushing, cleaning and sterilising appropriate pipework systems
- Cleaning all plant and equipment
- Lubricating plant and equipment in accordance with the manufacturers' recommendation and checking for serviceability
- Dampers, valves, etc., take up their correct positions when energised and de-energised
- Checks and inspections on the Electrical Installation in accordance with the IEE Regulations.

The Commissioning Specialist shall maintain a record of activities monitored.

Should the inspection carried out by the Commissioning Specialist reveal any of the Contract requirements have not been met, the matter will be reported to the Project Manager who shall draw

the default to the attention of the Contractor with instructions to rectify. When the default has been rectified the Commissioning Specialist shall re-inspect and report.

C.3.6 Monitoring and Witnessing Setting-to-Work

The Commissioning Specialist shall monitor and witness the Work Package Contractors activities to check compliance with the specified requirements, agreed method statements and procedures to enable systems to be released for commissioning.

Setting-to-work shall include:

- Checking correct rotation of electric motors and driven equipment
- Checking correct operation of switching, control elements, safety devices and electrical interlocks
- Checking correct application of water treatment

The Commissioning Specialist shall report any operation problems identified to the Project Manager.

C.3.7 Monitoring and Witnessing Commissioning and Performance Testing Activities

The Commissioning Specialist shall check that the commissioning works comply with the specified requirements, agreed method statements and procedures for commissioning and performance testing the installation.

Witness of commissioning and performance testing shall include, but not be limited to, the following:

- Regulation of system fluid flow rates including all variable volume controls
- Adjustment and calibration of BMS sensor, control elements and safety devices
- Operation of systems at design temperatures and checking adequacy of thermal expansion and contraction provisions
- Measurement of as balanced fluid flow rates, temperatures/temperature differentials, and pressures/pressure drops to determine plant, equipment and system performance against specified requirements
- Check that anti-vibration provisions are effective
- Check that the specified environmental conditions have been achieved in all building areas. Where appropriate checks shall include:
 - Dry Bulb Temperatures
 - Relative Humidity
 - Air Movement
- Check that specified noise levels are achieved within all areas of the building and to atmosphere

- Complete operation and functionality tests of the BMS/Automatic Controls Installation including all field components

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- Check Standby Generator and UPS functions as specified

- Tests on Electrical Installations and Equipment in accordance with the Current Edition of the IEE Regulations. Electrical tests shall include:
 - Continuity of protective conductors
 - Continuity of ring final circuit conductors
 - Insulation resistance
 - Insulation of non-conducting floors and walls
 - Polarity
 - Earth fault loop impedance
 - Earth electrode resistance
 - Operation of residual current operated devices
 - Prospective fault levels
 - Disconnection times for fuses/circuit breakers
 - Operation of warning and alarm signals
 - Operation of visual and audible alarms
 - Operation of automatic switching
 - Operation of interlocks
 - Operation of manual switching
 - Use of installations does not interfere with electronic equipment, radio, television signals, communication systems, etc.

The Commissioning Specialist shall take and record background noise levels at sample points on each floor and external to Plantrooms and enclosures to verify compliance with design noise criteria.

The Commissioning Specialist shall check that as each item is commissioned the relevant check lists and record sheets are completed and signed by the witnesses.

The Commissioning Specialist shall identify any difficulties in achieving the specified requirements and notify the Project Manager.

C.3.8 Witnessing Demonstrations of Operation

The Commissioning Specialist shall witness the operation of each system as demonstrated by the Contractor. During the demonstration all related systems shall be run simultaneously. The demonstrations are intended to show the systems operate in accordance with the specified requirements including:

- Plant, equipment and system switching
- Operation of BMS, controls and safety devices and systems
- Operation of plant, equipment and system interlocks
- Plant selection and changeover arrangements
- Interfaces with related systems and switching arrangements, eg. Fire alarm signal, power failure.

The Commissioning Specialist shall maintain a record of any specified operation requirement which is not met or satisfactorily demonstrated and shall notify the Project Manager accordingly.

C.3.9 System Reliability Trials

Upon completion of the commissioning and prior to Practical Completion a system reliability trial will commence immediately. This trial shall run continuously for a period of 14 days during which time the

Commissioning Specialist and the responsible Work Package Contractors shall be in constant attendance to carry out temperature, pressure and other recordings of the installations performance.

The Commissioning Specialist shall collate all readings taken over this period and present them for signing off by the Tenant.

C.3.10 Record Documents

The various Work Package Contractors are responsible for providing As-Fitted Record Drawings and Schedules, Operating and Maintenance Instructions, etc., as set down in their Contract Documentation.

The Commissioning Specialists duties shall include collating all record information from the Work Package Contractors into a comprehensive set of handover documentation and ensuring that they correctly reflect the nature and exact location of all completed installations and that the information provided is comprehensive and is in accordance with the Contract requirements.

C.3.11 Seasonal Commissioning

The Commissioning Specialist appointment shall include the following seasonal commissioning responsibilities over a minimum 12 month period, once the building becomes occupied.

Complex Systems - Specialist commissioning manager

- Testing of all building services under full load conditions, i.e. heating equipment in midwinter, cooling/ventilation equipment in mid-summer, and under part load conditions (spring/autumn)
- Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy
- Interviews with building occupants (where they are affected by the complex services) to identify problems or concerns regarding the effectiveness of the systems.
- Re-commissioning of systems (following any work needed to serve revised loads), and incorporating any revisions in operating procedures into the O&M manuals.

Where specialist building services systems such as fume cupboards, microbiological safety cabinets and a cold storage system are present then the assessor must ensure that these systems are included in the specialist commissioning agent's responsibilities.

Simple Systems (naturally ventilated) - External Consultant/Facilities Manager

- Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback
- Take all reasonable steps to re-commission systems following the review and incorporate any relevant revisions in operating procedures into the O&M manuals.

C.4 Engineering Services Commissioning Communications Flow Diagram

