

SECTION 01450  
INTEGRATED DELIVERABLES AND TESTING PLAN (IDAT)

PART 1 - GENERAL

1.01 SUMMARY OF WORK

- A. This section specifies administrative and procedural requirements for scheduling, performing, and reporting quality control requirements for this Project, referred to as the Integrated Deliverables and Testing (IDAT) process. The General Contractor shall be responsible for directing, coordinating and providing IDAT administrative process and services for this Project.
- B. Selected building equipment and systems which are to be installed, integrated and tested under the Integrated Deliverables and Testing (IDAT) process defined within the specific specification sections where testing or quality assurance and functional verifications are required.
- C. IDAT submittals and test results will be verified by the Contractor, the Architect and the Owner's Project Manager.

1.02 SUBMITTALS

- A. IDAT plan and schedule. [Submit prior to submitting the [first][second] Application for Payment.][Prepare and submit preliminary IDAT within 60 days of execution of the Contract.][Prepare and submit preliminary IDAT within 60 days of issuance of a Notice to Proceed by the Owner.]
  - 1. Submit preliminary schedule in the format illustrated at the end of this Section.
  - 2. Submit and updated IDAT monthly with each Application for Payment. Indicate which activities have been completed and which will be performed during the coming month.
- B. Prefunctional Checklists.
- C. Controls Checkout Plan.
- D. Reports of tests and inspections. Submit preliminary report within 24 hours after completing the test or inspection; submit final written report, including a description of remedial work undertaken if applicable, within \_\_ days of completing the test or inspection; or within \_\_ days after completing re-inspection or re-testing as follow up to remedial work, if applicable.
- E. Summary Report.

1.03 INTEGRATED DELIVERABLES AND TESTING PLAN (IDAT) SCOPE

- A. The IDAT plan and associated schedule is the master document that describes the results of the monitoring, documentation and scheduling process for ensuring that all building systems perform interactively according to the design intent and the owner's operational needs. The process of

IDAT during the construction of this project is intended to achieve the following specific objectives, in accordance with the Contract Documents:

1. Ensure that applicable equipment and systems are installed as specified and receive adequate Prefunctional and Functional operational checkout by installing contractors.
2. Verify and document proper performance of equipment and systems.
3. Ensure that O&M documentation left on site is complete.
4. Ensure that the Owner's operating personnel are adequately trained.

#### 1.04 ROLES AND RESPONSIBILITIES

A Team Members: The members of the IDAT team consists primarily of the General Contractor (GC), Owner's Project Manager (PM), assigned representatives of the Architect (particularly the mechanical engineer), the mechanical subcontractor, electrical subcontractor, TAB representative, controls contractor (CC), and other installing subcontractors or suppliers of equipment. The Owner's building or plant operator/engineer is also a member of the IDAT team.

B General Descriptions of Roles: General descriptions of the IDAT roles are as follows:

1. GC: Coordinates the IDAT process, writes and/or has written tests, oversees and documents performance tests. Facilitates the IDAT process, ensures that subcontractors perform their responsibilities and integrates IDAT into the construction process and schedule
2. Subcontractors: Demonstrate proper system performance in accordance with pre-functional and functional test procedures.
3. Architect: Perform construction observation, approve O&M manuals and assist in resolving problems. Facilitates and supports the IDAT process and gives final approval of the IDAT work in conjunction with the owner.
4. Manufacturers: The equipment manufacturers and vendors provide documentation to facilitate the IDAT work and perform contracted startup
5. PM: Perform construction observation, reviews and approve O&M manuals and assist in resolving problems. Facilitates and supports the IDAT process and reviews final testing and deliverables the IDAT work in conjunction with the A/E and CM.

#### 1.05 INTEGRATED DELIVERABLES AND TESTING PLAN (IDAT) PROCESS

A IDAT Scoping Meeting: Schedule and conduct the IDAT scoping meeting within **[90]** days of the beginning of construction for the purpose of introducing the team to each other, to review the IDAT process, and to determine management and reporting lines. Representatives of the

Contractor, Owner, Architect and the mechanical, electrical, controls, and TAB subs shall attend.

1. At the IDAT Scoping meeting discuss the IDAT process and submittals, including but not limited to document flow, how much and when submittal data will be received, approval procedures. As a minimum, include the following on the meeting agenda:
    - a. Review the IDAT.
    - b. Address process questions.
    - c. Determine lines of reporting and communications.
    - d. Discuss the work products list.
    - e. Discuss and list each party's responsibilities, for example, who is responsible for developing the startup plan for each piece of equipment.
    - f. Discuss the proposed IDAT schedule.
  2. The goal of the meeting is to increase understanding by all parties of the IDAT process and their respective responsibilities. The meeting provides the GC with additional information needed to finalize the IDAT, including the IDAT schedule.
- B. Final IDAT--Construction Phase: Finalize the draft IDAT using the information gathered from the scoping meeting. Develop the initial schedule in the form illustrated in Article 1.09. As construction progresses, fine tune the timeline content and provide status updates. In particular, [60] days prior to startup of the primary equipment, meets with the Architect, subcontractors, and Owner's Project Manager and develop a detailed schedule.
1. Obtain the Architect's written approval of the IDAT plan.
- C. Installation, Testing and Site Observation: The GC, Architect and Owner's Project Manager, if applicable, shall make periodic visits to the site, as necessary, to witness equipment and system installations and testing as applicable.
- D. Miscellaneous Meetings: The Architect and Owner's Project Manager will attend selected planning and job-site meetings in order to remain informed on construction progress and to update parties involved in the IDAT. Give these parties at least [4] days advance notice of such IDAT-related meetings.
- E. Initial Submittals and Documentation: Provide subcontractors responsible for equipment to be tested with IDAT documentation requirements for their respective equipment and systems. This data request shall coincide with the normal Shop Drawing Submittal process. At a minimum, include installation and start-up procedures, O&M data, performance data and control drawings. Review and approve submissions relative to IDAT issues expressed in the contract documents, but not for general contract compliance (which is the Architect's responsibility), unless specifically directed by the Owner to do so.
- F. Prefunctional Checklists, Tests and Startup: Pre-functional checklists (PC) are important to ensure that the equipment and systems are hooked up and operational and that functional performance testing may proceed without unnecessary delays. Each piece of equipment receives full prefunctional checkout by the Contractor. No sampling strategies are used. In

general, the prefunctional testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.

1. Prefunctional checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., oil levels OK, fan belt tension, labels affixed, gages in place, sensor calibration, etc.). However, some prefunctional checklist items entail simple testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a three phase pump motor of a chiller system). The word **pre**functional refers to **before** functional testing. Prefunctional checklists augment and are combined with the manufacturer's start-up checklist.

G. Controls Checkout Plan: The controls contractor (CC) develops and submits a written step-by-step plan to the CM, Architect and Owner's Project Manager which describes the process [they][the CC] intends to follow in checking out the control system and the forms on which [they][the CC] will document the process. The controls contractor will also meet with the TAB contractor prior to the start of TAB and review the TAB plan to determine the capabilities of the control system for use in TAB. The controls contractor will provide the TAB with any necessary unique instruments for setting terminal unit boxes and instruct TAB in their use (handheld control system interface for use around the building during TAB, etc.). The controls contractor shall also provide a technician qualified to operate the controls to assist the TAB contractor in performing TAB. Additional details are found in Specifications Section[s] **[15910 and 51950.]**

1. All GC-required controls prefunctional checklists, calibrations, start-up and selected functional tests of the system shall be completed and approved prior to TAB.

#### 1.06 DEVELOPMENT OF FUNCTIONAL TEST AND VERIFICATION PROCEDURES

A. Overview: Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all of the control system's sequences of operation and components are verified to be responding as the sequences state. The CM ensures that the functional test procedures are in sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor.

B. Scope of Testing: Testing Requirements specified in **[Division 2 through 16][Division 13, 14, 15 and 16]** technical specifications provide specific functional testing scope for each piece of equipment.

#### 1.07 EXECUTION OF FUNCTIONAL TESTING PROCEDURES

A. Overview and Process: The GC schedules functional tests and oversees, witnesses and documents the functional testing of all equipment and systems according to the Specifications and the IDAT. The Subcontractors execute the tests.

1. For any given system, prior to performing functional testing, wait until the prefunctional checklist has been submitted with the necessary signatures, confirming that the system is ready for functional testing.
2. Test the control system before it is used to verify performance of other components or systems.
3. Require air balancing and water balancing to be completed and debugged before starting functional testing of air-related or water-related equipment or systems.
4. When testing, proceed from components to subsystems to systems and finally to interlocks and connections between systems.
4. The final test of the mechanical, electrical, and plumbing systems cannot include I/O LOOP tuning or manual overrides as part of the final acceptance functional testing. It is the intent to have the entire system or systems run in the intended operational manner with complete software control as applicable.

B Deficiencies and Retesting: Document the results of the test. Corrections of minor deficiencies identified shall be made during the tests. Record the results of the test on the procedure or test form. Note deficiencies or non-conformance issues and report these to the Architect and Owner's Project Manager **[on Form C-6 IDAT Corrective Action Report][in writing]**. Require subcontractors to correct deficiencies, notify the GC and **[return Form C-6 certifying correction.][notify the GC in writing that correction has been completed.]** Schedule retesting as necessary to correct deficiencies. For areas in dispute, final authority resides with the Architect and Owner.

C. Facility Staff Participation: The Owner's facilities operating staff are encouraged to attend and participate in the testing process.

## 1.08 SUMMARY REPORT

A. Prepare a final summary report and submit to the Architect and Owner's Project Manager for review and approval. **[This report shall be a prerequisite to Substantial Completion.]**

*The report shall include:*

1. *An executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and a general description of testing and verification methods.*
2. *For each piece of commissioned equipment, the disposition of the commissioning authority regarding the adequacy of the equipment, documentation and training meeting the contract documents. Does the equipment meet the specifications? Has it been properly installed? Does the functional performance and efficiency meet the specifications? Equipment documentation and design intent. [I don't know what that means- EC]. Record of training of Owner's personnel.*

3. *List all outstanding non-compliance items, with a reference to the specific functional test, inspection, trend log, etc. where the deficiency is documented. List recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc.*
4. *The functional performance and efficiency section for each piece of equipment shall include a brief description of the verification method used (manual testing, BAS trend logs, data loggers, etc.) and include observations and conclusions from the testing.*
5. *Attach appendices containing acquired sequence documentation, logs, meeting minutes, progress reports, deficiency lists, site visit reports, findings, unresolved issues, communications, etc.*
6. *Compile and submit prefunctional checklists and functional tests (along with blanks for the operators) and monitoring data and analysis in a separate labeled binder.*

*The commissioning plan, the prefunctional checklists, functional tests and monitoring reports will not be part of the final report, but will be stored in the Commissioning Record in the O&M manuals, as described in the specification Section 01770.*

#### 1.09 SCHEDULE

A. General: Sequence IDAT activities as follows:

1. Before "temporarily" starting equipment (for heating and cooling), complete pre-start checklist items and all manufacturers' pre-start procedures and address moisture, dust and other environmental and building integrity issues .
2. Before beginning functional testing, complete pre-functional testing and start-up for a given system. (This does not preclude a phased approach).
3. Before performing functional testing of the controls system and equipment it controls, complete the calibration and pre-functional testing of all points.
4. Do not perform TAB until the controls system has been fully tested functionally and approved.
5. Do not perform TAB until the envelope is completely enclosed and ceiling complete, unless the returns are is ducted.

B. Project Schedule Guide: A draft initial IDAT schedule is summarized below.

B. Project Schedule Guide: A sample format for the initial IDAT schedule is illustrated below.

#### INITIAL IDAT SCHEDULE SUMMARY

<b>Task / Activity</b>	<b>Estimated Start Date</b>	<b>Estimated End Date</b>
------------------------	-----------------------------	---------------------------

<b>Task / Activity</b>	<b>Estimated Start Date</b>	<b>Estimated End Date</b>
Initial scoping meeting and final plan		
Submittals obtained and reviewed		
Begin construction site visits/inspections		
Prefunctional forms developed and distributed		
Startup and initial checkout plans		
Startup and initial checkout executed		
TAB                      Water Air		
Functional performance tests		
O&M documentation review and verification		
Training and training verification		
Final IDAT [ <b>Summary</b> ] report		
Additional seasonal testing		

END OF SECTION 01450

**University of Southern Maine  
Integrated Deliverables and Testing Plan  
Corrective Action Report**

Project: [USM NO?], Science Building Research Wing Expansion

SMMA ID No.: \_\_\_\_\_

Date: \_\_\_\_\_

Equipment: \_\_\_\_\_ Equipment ID: \_\_\_\_\_

Identified from: \_\_\_ Test, \_\_\_ Review, \_\_\_ Discussion \_\_\_,  Site visit \_\_\_

The above equipment has been observed, tested or the performance report reviewed and was found to not comply with the contract documents.

Deficiencies or Issues and Effects:

-----  
-----  
-----  
-----  
-----  
-----

Corrective Action:  Required  Recommended.

-----  
-----  
-----  
-----

For testing to proceed in a timely manner, it is imperative that the required corrective action be completed by: \_\_\_\_\_  
Date or Event

-----  
IDTP CM Agent

Date

PM / Owner's Representative

Date

Forwarded to the following parties on \_\_\_\_\_ for corrective action:  
Date

Attachments: Yes \_\_\_ No \_\_\_ Comment:  
-----

**Distribution**

The following checked individuals will receive these documents for action, review and/or approval as appropriate:



<u>Party</u>	<u>For review &amp; comment only</u>	<u>For review &amp; action</u>	<u>For record only</u>
CM	-----	-----	-----
Harriman	-----	-----	-----
USM, Dana A. Gray	-----	-----	-----
USM, Dave Schurman	-----	-----	-----
USM,	-----	-----	-----
	-----	-----	-----
	-----	-----	-----

---

Fill in the following section and return entire form to USM PM agent when corrected.

**Statement of Correction**

The above deficiencies have been corrected with the following actions:

---

---

-----

---

-----

---

-----

---

-----

---

-----

---

-----

---

-----

---

-----

---

-----

---

-----

---

-----

---

Signature      Firm      Date