

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 are 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 Activities Schedule and Schedule of Values: Prepare and submit preliminary IDAT Activities Schedule and IDAT Schedule of Values within 30 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 an updated IDAT Activities Schedule monthly with each Application for Payment. Identify activities which have been completed and activities which will be performed during the coming month.
- B. Prefunctional Checklists, as specified in 1.04 F.
- C. Controls Checkout Plan, as specified in 1.04 G.
- 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 14 days of completing the test or inspection; or within 14 days after completing re-inspection or re-testing as follow up to remedial work, if applicable.
  - 1. Prepare reports in a format which is acceptable to the Owner and Architect, to facilitate their comprehension and evaluation of IDAT information and progress. Submit sample Reporting Form to the Owner and Architect for approval in advance of performing any tests or inspections.
- E. Summary Report: Prepare and submit the Summary Report described at the end of this Section prior to requesting inspection at the time of Substantial Completion.

### 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 Operating and Maintenance documentation required under Section 01770 is complete and accurate.
  4. Ensure that the Owner's operating personnel are adequately trained.

### 1.04 ROLES AND RESPONSIBILITIES

- A Team Members: The IDAT team consists primarily of the Contractor, Owner's Project Manager, assigned representatives of the Architect (particularly the mechanical engineer), the mechanical subcontractor, electrical subcontractor, representative of the Testing and Balancing agency, controls subcontractor, 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 Responsibilities:
1. Contractor: The Contractor is the entity so identified in the Owner-Contractor Agreement. The Contractor coordinates the IDAT process and is responsible for identifying, scheduling, overseeing and documenting performance tests. Facilitates the IDAT process, ensures that subcontractors perform their responsibilities and integrates IDAT into the construction process and schedule. Work described in this Section 01450 is the responsibility of the Contractor unless otherwise stated.
  2. Subcontractors: Demonstrate proper system performance in accordance with pre-functional and functional test procedures.
  3. Architect: Performs periodic construction observation in accordance with the terms of the Architect's contract with the Owner; reviews Operation and Maintenance manuals and assists in resolving problems. Facilitates and supports the IDAT process and recommends approval (or rejection) of the IDAT work.
  4. Manufacturers: The equipment manufacturers and vendors provide documentation to facilitate the IDAT work and perform contracted startup
  5. Owner's Project Manager: Performs 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 Architect and General Contractor.

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

- A. IDAT Scoping Meeting: Within 60 days of the issuance of the Notice to Proceed by the Owner, schedule and conduct the IDAT scoping meeting 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 Contractor with additional information needed to finalize the IDAT, including the IDAT schedule.
  3. Record minutes of the IDAT Scoping Meeting and distribute the minutes to the Owner, the Architect, other attendees, and other parties affected by IDAT activities within five working days after the meeting.
- B. IDAT Activities Schedule and Schedule of Values: 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. At least 30 days prior to startup of the equipment, meet with the Architect, subcontractors, and Owner's Project Manager and develop a detailed schedule.
1. Obtain the Architect's and Owner's written approval of the IDAT plan.
- C. Installation, Testing and Site Observation: The Contractor, 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 5 working days advance notice of such IDAT-related meetings.

E Submittals and Documentation:

1. Contractor shall instruct the subcontractors regarding IDAT documentation requirements for their respective equipment and systems.
2. Subcontractors shall include a description of IDAT documentation requirements with their Shop Drawing Submittals. At a minimum, include installation and start-up procedures, Operating and Maintenance data, performance data and control drawings.
3. Contractor shall review and approve submissions for conformance with IDAT issues expressed in the Contract Documents, in accordance with Contractor's responsibilities for Shop Drawing review set forth in the General Conditions of the Contract and Section 01330.
4. Architect's Review of Submittals and Documentation: IDAT Submittals are considered Quality Assurance Submittals, as defined in Section 01330. The Architect will review and approve IDAT documentation only to the extent necessary to confirm that the IDAT procedures are being followed and IDAT activities are being performed in accordance with the approved Contractor's IDAT Activities Schedule, in accordance with Architect's responsibilities under the General Conditions of the Contract and Section 01330.

F. Prefunctional Checklists, Tests and Startup: Pre-functional checklist activities are performed prior to functional testing. Pre-functional tests and inspections ensure that the equipment and systems are hooked up and operational and that functional performance testing may proceed without unnecessary delays. Every piece of equipment must receive a full prefunctional checkout by the subcontractor installing it; no sampling strategies may 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). Prefunctional checklists augment and are combined with the manufacturer's start-up checklist.
2. Prefunctional checklists, calibrations, start-up and selected functional tests of the system which are the responsibility of the Contractor shall be completed and approved before system Testing and Balancing, as specified in Section 15950, begins.

G. Responsibilities of the Controls Subcontractor; Controls Checkout Plan:

1. Develop and submit a written step-by-step plan to the Contractor, Architect and Owner's Project Manager which describes the process the Controls Subcontractor intends to follow in checking out the control system and the forms which the Controls Subcontractor will use to document the process.

2. Meet with the Testing and Balancing Agency prior to the start of testing and balancing activities and review the testing and balancing plan to determine the capabilities of the control system for use in testing and balancing.
3. Furnish to the Testing and Balancing Subcontractor instruments which are necessary for setting terminal unit boxes (such as handheld control system interface for use around the building during testing and balancing) and instruct the Testing and Balancing Subcontractor in their use.
4. Employ and pay for a technician qualified to operate the controls to assist the Testing and Balancing Subcontractor in performing testing and balancing activities. Additional details are found in Specifications Sections 15910 and 15950.

#### 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 (for example, 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 Contractor 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 technical specifications provide specific functional testing scope for each piece of equipment.

#### 1.07 EXECUTION OF FUNCTIONAL TESTING PROCEDURES

- A. Overview and Process: The Contractor 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. Before beginning functional testing of a system, submit the prefunctional checklist with the necessary signatures confirming that the system is ready for functional testing.
  2. Test the control system to verify performance of other components or systems.
  3. Complete air balancing and water balancing 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.
  5. I/O LOOP tuning and manual overrides shall not be included in final acceptance functional testing of mechanical, electrical, and plumbing systems. For final acceptance

functional testing, run the entire system or systems 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 in writing. Require subcontractors to correct deficiencies, and notify the Contractor 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 will be encouraged to attend and participate in the testing process.

#### 1.08 IDAT 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. As a minimum, include the following information in the IDAT Summary Report:
  - 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, Contractor's certification that equipment furnished meets the specifications, has been properly documented, has been properly installed, and that the functional performance and efficiency of the installed equipment meets the specifications. 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.
  - 3. Record of training of Owner's personnel. Include Contractor's certification that Operating and Maintenance documentation and training of Owner's personnel met the requirements stated in the Contract Documents.
  - 4. List outstanding non-compliance items, with a reference to the specific functional test, inspection, trend log, or other document where the deficiency is documented. List recommendations for improvement to equipment or operations, future actions, commissioning process changes, and similar remedial measures.
  - 5. Attach appendices containing acquired sequence documentation, logs, meeting minutes, progress reports, deficiency lists, site visit reports, findings, unresolved issues, and communications.
- B. It is not necessary to include the commissioning plan, the prefunctional checklists, functional tests and monitoring reports in this IDAT Summary Report. These documents shall be inserted into and submitted with the Operating and Maintenance manuals 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 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>
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		
IDAT Summary Report		
Additional seasonal testing		

PART 2 - PRODUCTS                      (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01450