

SECTION 01810
INTEGRATED DELIVERABLES AND TESTING (IDAT)

PART I – GENERAL

1.01 PROVISIONS INCLUDED

- A. The general provisions of the Contract, including General and Supplementary Conditions and Division 1 - General Requirements, apply to work specified in this Section.

1.02 SUMMARY

- A. This Section includes the monitoring, documentation and scheduling process for ensuring that building systems perform interactively according to the design intent and the owner's operational needs.
- B. Attachments:
 - 1. Sample checklist.
 - 2. Corrective Action Report form.
- C. Related Sections include the following:
 - 1. Division 1 Section "Quality Requirements" for general administrative and procedural requirements for quality assurance and quality control.
 - 2. Division 1 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 3. Division 1 Section "Demonstration and Training" for demonstration, training and documentation procedures.

1.03 DEFINITIONS

- A. Architect/Engineer (A/E): Includes Architect/Engineer identified in the Contract for Construction between Owner and Contractor, plus consultant design professionals responsible for design of HVAC, electrical communications, controls for HVAC systems, and other related systems.
- B. Commissioning Agent: Commissioning Agent hired by Owner for mechanical systems.
- C. IDAT: Integrated Deliverables And Testing Plan. 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 construction is intended to achieve the following specific objectives in conformance with the Contract Documents:
 - 1. Ensure that applicable equipment and systems are installed as specified and receive adequate Prefunctional and Functional operational checkout by Contractor and installing subcontractors.
 - 2. Verify and document proper performance of equipment and systems.
 - 3. Ensure that operation and maintenance manuals are complete.
 - 4. Ensure that the Owner's operating personnel are adequately trained.

- D. Project Manager (PM): Owner's/USM's Project Manager.
- E. Contractor/General Contractor/Construction Manager: The party identified as the Contractor or Construction Manager at Risk in the Agreement.
- F. TAB: Testing, Adjusting, and Balancing; or subcontractor responsible for testing, adjusting and balancing.

1.04 IDAT TEAM RESPONSIBILITIES

- A. The members of the IDAT team consists primarily of the General Contractor, USM's Project Manager, Plant Operator, Architect/Engineer (particularly the mechanical engineer), the mechanical subcontractor, electrical subcontractor, TAB representative, controls subcontractor, any other installing subcontractors or suppliers of equipment.
- B. General description of IDAT responsibilities are as follows:
 1. Architect/Engineer: Performs construction observation, reviews submittals, test results, operation and maintenance manuals and assists in resolving problems. Assists and supports the IDAT process and gives final verification of the IDAT work in conjunction with the Owner.
 2. General Contractor: Provides and coordinates the IDAT administrative process, prepares construction-phase IDAT plan, writes or has tests reports prepared, oversees and documents performance tests. Facilitates the IDAT process, ensuring that Subs perform their responsibilities and integrates IDAT into the construction process and coordinated with overall Project schedule.
 - a. Ensures testing, quality assurance and functional verifications are performed, and results are in conformance with the contract documents.
 - b. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
 - c. Prepare attendance lists, and notifying participants.
 3. Manufacturer: Equipment manufacturers and vendors provide documentation to facilitate the IDAT work and perform contracted startup.
 4. Project Manager: Perform construction observation, review and approve operation and maintenance manuals, reviews submittals and test results and assist in resolving problems. Assists and supports the IDAT process and-reviews final testing and deliverables of the IDAT work in conjunction with the Architect/Engineer and General Contractor.
 5. Sub Contractors: Demonstrate proper system performance in accordance with pre-functional and functional test procedures. Assist testing and commissioning operations as required by the contract documents.

1.05 INTEGRATED DELIVERABLES AND TESTING PLAN PROCESS

- A. Initial IDAT Meeting: General Contractor shall plan out and conduct a meeting within 30 days of the beginning of construction. In attendance shall be the authorized representatives of the General Contractor, Owner's Commissioning Agent, Owner's Project Manager,

Architect/Engineer, Manufacturer, of major equipment, and the mechanical, electrical, controls, and Owner's Mechanical Commissioning Agent and TAB subcontractor. Hold the conference at Project site or another convenient location. The goal of the meeting is to increase understanding by all parties of the IDAT process, their respective responsibilities, and provide the General Contractor with information required to finalize the IDAT plan and schedule.

1. Agenda: Include the following:
 - a. Parties are introduced and contact information provided for each authorized representative assigned to the IDAT team.
 - b. IDAT process reviewed, with management, communications and reporting lines determined. Participant questions and issues addressed.
 - c. Review of document flow, how much and when submittal data will be received and approved.
 - d. General list of each party's responsibilities. (Example: Assign who is responsible to develop the startup plan for each piece of equipment or system.)
 - e. Proposed IDAT schedule.

- B. Specific testing of materials specified in the Division 2 thru 16 sections and procedures described in Section "Quality Requirements" are separate from the IDAT process. In some cases, the verification of these tests may be included in the prefunctional/preinstallation checklist to verify completion of a system before it is incorporated and made inaccessible by the Work. (Example: Air/vapor barrier inspection completed before permanently concealed by masonry installation.)

1.06 INTEGRATED DELIVERABLES AND TESTING PLAN

- A. Integrated Deliverables and Testing Plan: A document, prepared by General Contractor, that outlines the schedule, allocation of resources, and documentation requirements of the integrated deliverables and testing, and shall include, but is not limited to the following:
 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports. Identification of the relationship of these documents to other functions and a detailed description of submittals that are required to support the IDAT processes. Submittal dates shall include the latest date approved submittals must be received without adversely affecting IDAT plan.
 2. Description of the organization, layout, and content of documentation, and a detailed description of documents to be provided along with identification of responsible parties.
 3. Identification of systems, materials and equipment to be monitored, inspected, tested and documented.
 4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.
 5. Identification of items that must be completed before the next operation can proceed.
 6. Description of responsibilities of team members.
 7. Description of observations to be made.

8. Description of expected performance for systems, subsystems, equipment, and controls.
 9. Schedule for activities with specific dates coordinated with overall construction schedule. Include coordination meetings for parties involved with the preparation of Certificate of Readiness, and meetings at periodic intervals with all participants to review project IDAT status.
 10. Identification of installed systems, subsystems, and equipment, including design changes that occurred during the construction phase.
 11. Step-by-step procedures for checklists, inspections, testing systems, subsystems, and equipment with descriptions for methods of verifying relevant data, recording the results obtained, and listing parties involved in performing and verifying tests.
- B. Mechanical System Commissioning: The Owner will employ a third-party Commissioning Agent to commission the mechanical system and controls. The General Contractor shall coordinate with the Owner's Commissioning Agent, and include in the IDAT plan specific dates for mechanical system commissioning, coordinated with the overall construction schedule.
- C. Certificate of Readiness: Certificate of Readiness for each Installation Checklist shall be prepared and signed by General Contractor and Subs certifying that systems, subsystems, equipment, and associated construction are ready for testing and verification.
- D. Installation Checklists: Develop checklists for each system, subsystem, or equipment. Include a separate entry, with space for comments, for each item to be verified. Provide space for participants and personnel to sign off on each checklist. See sample Installation Checklist included at the end of this section. Each checklist, regardless of system, subsystem, or equipment being verified, shall include, but not be limited to, the following:
1. Name and identification of item.
 2. Checklist number.
 3. Time and date of verification.
 4. Location of system, subsystem, or equipment being tested or verified.
 5. Indication of whether the record is for a first test/verification or retest/reinspection following correction of a problem or issue.
 6. Dated signature of the person performing test and inspections and of the witness, if applicable.
 7. Individuals present.
- E. Corrective Action Report: When system, subsystem, or equipment being tested/verified was found to not comply with the contract documents, prepare a Corrective Action Report for listing of deficiencies. See sample Corrective Action Report included at the end of this section.
1. Correlate report with related Installation Checklist.
 2. List deficiencies and issues.
 3. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.
 4. Identify expected date of correction.
 5. State that correction was completed and system, subsystem, and equipment are ready for retest/verification.
 6. Log date correction is completed or the issue is resolved.
 7. Identify person(s) who corrected or resolved the issue.
 8. Identify person(s) documenting the issue resolution.

1.07 SUBMITTALS

- A. IDAT Plan Prefinal Submittal: General Contractor shall submit two hard copies of prefinal commissioning plan, and two sets of electronically formatted information. Present submittal in sufficient detail to evaluate data collection and arrangement process. One copy, with review comments, will be returned to the General Contractor for preparation of the final construction-phase commissioning plan.
- B. Commissioning Plan Final Submittal: General Contractor shall submit two hard copies and two sets of electronically formatted information of final commissioning plan. Deliver one hard copy and one set of discs to Owner, and one copy to Architect. The final submittal must address previous review comments. The final submittal shall include a copy of the prefinal submittal review comments along with a response to each item.
- C. Installation Checklists and Report Forms: General Contractor shall submit sample checklists and forms to subcontractors for review and comment before submitting to Architect. Submit two hard copies and two sets of electronically formatted checklist and report form. Forms will be reviewed by Architect and Owner for content. Review comments, will be returned to the General Contractor for-preparation of the final construction-phase Installation Checklists.
 - 1. Submit completed and signed forms upon completion of each Installation Checklist.
- D. Certificates of Readiness: General Contractor shall submit Certificates of Readiness to all parties involved in the system, Subsystem, or equipment being tested/verified.
- E. Corrective Action Reports: General Contractor shall submit Corrective Action Reports to all parties involved in the system, subsystem, or equipment being tested/verified.
- F. See Section "Project Record Documents" for preparation of complete record of submittals for project record documents.

1.08 COORDINATION

- A. Coordinating Meetings: General Contractor shall conduct coordination meetings as scheduled with the IDAT team to review progress on the IDAT plan, to discuss scheduling conflicts, and to discuss upcoming activities.
- B. Prefunctional Meetings: General Contractor shall conduct prefunctional meetings with the Subs to review readiness of system, subsystem, or equipment being tested/verified, and issuance of the Certificates of Readiness.
- C. Testing Coordination: General Contractor shall coordinate sequence of testing activities to accommodate required quality-assurance and -control services 'with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate sting and inspecting.
 - I. Schedule times for tests, inspections, obtaining samples, and similar activities.
- D. Manufacturers' Field Services: General Contractor shall coordinate services of manufacturers' field services.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 INSTALLATION CHECKLIST

- A. The General Contractor shall prepare checklists for each of the project components in the form illustrated by the Sample Installation Checklist which is attached to this Section. As a minimum include the items listed below as part of the project checklists developed for the IDAT Plan for this Project:
1. Where no specific components are listed, or where noted as "TBD" ("to be developed"), the list will be developed by the Owner (USM), the Contractor (Pizzagalli) and the Architect (SMMA) before work on the listed system or subsystem begins.
- B. Blocking:
1. Prefunctional / Preinstallation Checklist
 - a. Metal framing installed, ready to receive blocking.
 - b. Shop drawing for items to be supported are complete with heights and locations of blocking identified.
 2. Functional Performance Test / Post-installation Checklist
 - a. Blocking in size and thickness required has been installed for all items, including:
 - 1) Door Stops,
 - 2) Toilet accessories.
 - 3) Tack boards and Marker boards.
 - 4) Shelving.
 - 5) Millwork and custom casework.
 - 6) Building specialties.
 - 7) Owner furnished items.
 - 8) Roof blocking, base flashing backer, and equipment supports.
 - 9) Drywall window return shims.
 - 10) Countertop supports.
 - 11) Panel board supports.
 - 12) Miscellaneous items.
- C. Air/Vapor Barrier System: Not applicable.
- D. Doors and Hardware:
1. Prefunctional / Preinstallation Checklist:
 - a. Frames are properly anchored, square, plumb, and in alignment.
 - b. Painting is complete before installation of hardware, including hinges.
 - c. Fire-rating labels are exposed and unpainted.
 - d. Conduct walk thru with Owner's security contractor and USM campus hardware specialists to review security contractor supplied equipment requirements and conditions.
 - e. Coordination meeting with USM campus hardware specialist, review of Owner furnished off line locksets.
 - f. Submittals for doors, frames, aluminum entrances, and door hardware coordinated and completed.

2. Functional Performance Test / Post-installation Checklist
 - a. Correct door and fire-rating installed in opening.
 - b. Door closers properly installed, arms in correct position, back check, closing speed and latching speed properly set, covers installed and secure.
 - c. Spring hinges set to proper tension, with tension similar throughout facility. Verify two spring hinges supplied for each door leaf schedule to receive spring hinges.
 - d. Door stops fastened to solid blocking.
 - e. Locks, exit devices and other hardware functioning properly. Door clearances correct, free of rubbing frames and floor surfaces.
 - f. Pairs of doors properly spaced and dead latching feature is functioning properly.

E. Ceilings:

1. Prefunctional/Preinstallation Checklist:
 - a. Work above ceiling is complete, including:
 - 1) Duct work, dampers, diffusers.
 - 2) Sprinkler.
 - 3) Conduit, piping, cabling.
 - 4) Fire stopping.
 - 5) Sprayed fire-resistive material checked for damage.
 - 6) Fire rating stenciled on walls above ceilings.
 - 7) Light fixture installation complete.
 - 8) Safety hanger wire supports for fixtures installed.
2. Functional Performance Test / Post-installation Checklist
 - a. Grid layout installed to reflected ceiling plan.
 - b. Grid hangers properly spaced and hung from structure.
 - c. Exposed edges of acoustical tile finished.
 - d. Hold-down clips installed at required locations.
 - e. Escutcheons properly covering openings and cutouts.
 - f. Ceiling tile and grid inspected for marks and damage.

F. Floor Coverings and Wall Base:

1. Prefunctional/Preinstallation Checklist:
 - a. Adequate lighting levels available for visual inspections and installation.
 - b. Proper environmental conditions scheduled and provided for application and curing of adhesives, including temperature, humidity, ventilation, airborne dust and contaminants.
 - c. Surface temperatures of substrates maintained within floor covering manufacturer's requirements. Process set up to monitor and record temperatures of substrates, and air temperatures before, during and after installation.
 - d. Work that could damage floors by other trades is complete before start of installation.
 - e. Project schedule is coordinated to complete work by other trades and vacate areas receiving floor coverings stopping pedestrian traffic over newly installed flooring until curing and drying period is complete. Conduct periodic coordination meetings with all trades to review schedule and procedures to prevent interference and damage during installation and curing/drying period of floor coverings.
 - f. Moisture tests are complete and in compliance with specified requirements.

- g. Gypsum board is within specified distance to floor for proper support of resilient wall base.
 - h. Saw cuts, cracks and openings properly filled to support floor covering, surface imperfections in substrate filled and leveled to prevent telegraphing thru floor covering.
 - i. Surfaces are clean, free of dirt and grit that will telegraph thru floor covering.
2. Functional Performance Test/Post-Installation Checklist:
- a. Floor covering is complete, run into recesses and properly terminated at transitions.
 - b. Joints and seams are tight.
 - c. Adhesive trowel marks do not telegraph thru floor covering.
 - d. Resilient wall base complete within room, including toe kick spaces of casework. Joints are tight, top of base is straight and aligned.
 - e. Proper protection provided for completed floors.
 - f. Final cleaning and waxing operations complete.
- F. Painting:
1. Prefunctional / Preinstallation Checklist:
- a. Adequate lighting levels available for visual inspections and application.
 - b. Proper environmental conditions maintained for application and drying of coatings, including temperature, humidity, ventilation, airborne dust and contaminants.
 - c. Inspect walls for dents and imperfections, with gypsum board installer and painter.
 - d. Gypsum board touch up of dents and imperfections completed.
 - e. Rooms are broom clean, surfaces have been dusted, including wall surface, ledges, sills, tops of door frames.
 - f. Cover plates removed.
 - g. Fire-rating labels masked.
 - h. Benchmark sample rooms, coating and colors are complete and approved before start of painting operations.
2. Functional Performance Test / Post-Installation Checklist:
- a. Inspect walls for dents and imperfections, with gypsum board installer and painter after prime coat.
 - b. Gypsum board touch up of dents and imperfections completed and primer applied to touch ups.
 - c. Primers and coating continually being checked for proper application mil thickness.
 - d. Inspect completed surfaces for compliance with benchmark samples. Damaged and marred surfaces of completed work touched-up just before Owner occupation.
 - e. Cover plates installed.
 - f. Color mix codes submitted.
- G. Fire Suppression System: Coordinate with requirements of Division 13.
1. Prefunctional/Preinstallation Checklist: TBD
2. Functional Performance Test / Post-installation Checklist: TBD
- H. Fire Detection and Alarm System: Coordinate with requirements of Division 13.
1. Prefunctional/Preinstallation Checklist: TBD

- 2. Functional Performance Test / Post-installation Checklist: TBD
- I. Plumbing Systems: Coordinate with requirements of Division 15.
 - 1. Prefunctional/Preinstallation Checklist: TBD
 - 2. Functional Performance Test / Post-installation Checklist: TBD
- J. HVAC Systems: Coordinate with requirements of Division 15.
 - 1. Prefunctional/Preinstallation Checklist: TBD
 - 2. Functional Performance Test / Post-installation Checklist: TBD
- K. Electrical Systems: Coordinate with requirements of Division 16.
 - 1. Prefunctional/Preinstallation Checklist: TBD
 - 2. Functional Performance Test / Post-installation Checklist: TBD

SECTION CONTINUES WITH SAMPLE CHECKLIST AND
CORRECTIVE ACTION REPORT FORM

Sample
Installation Checklist

Project _____

IC for **Air/Vapor Barrier System**

Location _____

1. Submittal / Approvals:

Submittal. The above material and systems integral to them are complete and ready for installation of exterior finishes. The checklist items are complete and have been checked off only by parties having direct knowledge of the event, as marked below, respective to each responsible contractor. This checklist is submitted for record, subject to an attached list of outstanding items yet to be completed. A Statement of Correction will be submitted upon completion of any outstanding areas. _____List attached.

General Contractor	Date	Air/Vapor Barrier Contractor	Date
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Checklist items are to be completed as part of preparatory work before installation of masonry and metal wall panels.

- This checklist does not take the place of the manufacturer's recommended checkout and installation procedures.
- Items that do not apply shall be noted with the reasons on this form (N/A = not applicable, BO = by others).
- If this form is not used for documenting, one of similar rigor shall be used.
- Contractors assigned responsibility for sections of the checklist shall be responsible to see that checklist items by their subcontractors are completed and checked off.
- "Contr." column or abbreviations in brackets to the right of an item refer to the contractor that to verified completion of this item. All = all contractors, GC = general contractor, IS = Installing Contractor, EC = electrical contractor

Approvals. This filled-out checklist has been reviewed. Its completion is approved with the exceptions noted below.

General Contractor	Date	Owner's Representative	Date
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Owner's Inspection Agency	Date
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Notes:

2. Requested documentation submitted:

Check if Okay. Enter comment or note number if deficient.

Check						Contr.
Manufacturer's Product Data						
Shop Drawings showing interface with adjacent components						
Installer Qualification Data						
Additional Checks:						

- Documentation complete as per contract documents for given trade..... Yes No

3. Installation Checks

Check if Okay. Enter comment or note number if deficient.

Check						Contr.
Prefunctional/Pre-installation Checklist						
Blocking complete						
Sheathing in compliance with specified requirements						
Adjacent materials ready for A/V barrier installation						
Additional Checks:						
Functional Performance Test / Post-installation Checklist						
Sheathing joints properly prepped and detailed						
Tie in to adjacent material completed						
Application to field of wall completed						
Completed area inspected and approved by Independent testing agency						
Additional Checks:						
Text Description:						
Results:						

- The checklists of Part 3 have all been successfully completed..... YES NO

- END OF CHECKLIST--

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

Project: _____ ID: _____ 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

<small>IDTP CM Agent</small>	<small>Date</small>	<small>PM/Owner's Representative</small>	<small>Date</small>

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 & comment only</u>	<u>For review & action</u>	<u>For record only</u>
Haniman			
USM, Dana A. Gray			
USM, Dave Schurman			
USM			

