

## **SECTION 211101 – LEAK TEST FIRE PROTECTION PIPING SYSTEMS**

Latest Edition: 12-17-2021 See Underlined Text for Edits.

(Engineer shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Also turn off all “Underlines”.)

### **PART 1 – GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section and all other sections of Division 21.

#### **1.2 SUMMARY**

- A. This Section includes the requirements for leak testing the following systems:  
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  - 1. Wet pipe fire protection system.
  - 2. Dry pipe fire protection system.
  - 3. Pre-Action fire protection system.

#### **1.3 SUBMITTALS**

- A. General: Submit completed certified test reports in “pdf” format for each item in this Section according to the conditions of the contract and Division 01 Specification Sections.

#### **1.4 QUALITY ASSURANCE**

- A. Testing shall be performed by the installer of system being tested in presence of the UMB Fire Marshall or their representative.

#### **1.5 WARRANTY/GUARENTEE**

- A. See Division 21, Specification Section “Basic Fire Protection Requirements” for warranty and guarantee requirements.

### **PART 2 – PRODUCTS**

#### **2.1 PIPE SYSTEM LEAK TEST APPARATUS**

- A. The contractor conducting the test shall arrange for and provide all temporary services, all test apparatus, all gauges, hoses and qualified personnel necessary to conduct the required

testing. All leak tests shall be witnessed by the UMB Fire Marshal. UMB requires a minimum of five (5) business days' notice for all leak test. Prior to scheduling the test with the University the contractor shall pretest the system or segment to ensure all joints, connections etc are leak free.

- B. Test apparatus shall include a pump of appropriate size and pressure for all pressurized systems and an oil free air compressor or gaseous nitrogen to pressurize all gaseous piping systems to the required test pressures. Gauges used for testing shall be as follows:
  - 1. Gauges shall be four (4) inch diameter dial type gauges.
  - 2. Tests requiring a pressure of 10 pounds per square inch (psi) or less shall utilize a testing gauge having increments of 0.10 psi or less.
  - 3. Tests requiring a pressure of greater than 10 psi but less than or equal to 100 psi shall utilize a testing gauge having increments of 1 psi or less.
  - 4. Tests requiring a pressure of greater than 100 psi shall utilize a testing gauge having increments of 2 psi or less.
- C. Pressure gauges used for the test shall be in the required range and increment for the appropriate test.
- D. All gauges must be calibrated and set at zero (0) before pressure is applied to the test segment.
- E. The contractor conducting the test shall utilize the "UMB Standard Pipe System Leak Test Summary Form" for each pipe test to record the test results. Where multiple tests are conducted on the same pipe section a summary report of each test (pass and failed test) shall be prepared. Each summary report shall be signed by each of the parties witnessing the test. The completed reports shall be forwarded to the Construction Manager (CM) or the General Contractor (GC). The CM or GC shall provide a copy of the reports to UMB Project Manager.

### **PART 3 – EXECUTION**

#### **3.1 TEST PROCEDURES**

- A. Test each pipe system as a whole or in segments as required by progress of the work. Perform tests prior to installation of piping insulation.
- B. All required tests shall be performed by the sprinkler contractor as part of this contract. The contractor shall see that proper representatives of the Owner, the Engineer, UMB Fire Marshall, Office of Facilities Management, and any other individuals desiring to witness the tests shall be notified at least five (5) business days prior to the scheduled test time.

C. All Piping Systems include piping exposed above grade within the building, piping below floor slabs within the building, piping below grade five (5) feet beyond the exterior foundation wall, and / or piping above the building roof elevation and are defined as follows:

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1. Wet Pipe Fire Protection System: Wet piping systems, including stand pipes, serving all areas of the building and/or the project area.
  2. Dry Pipe Fire Protection Piping System: Dry pipe system(s) serving selected areas of the building and/or the project area.
  3. Pre-Action Fire Protection Piping System: Pre action pipe system(s) serving selected areas of the building and/or the project area.
- D. Arrangements shall be made by the contractor to separate new systems from existing risers or systems with blank testing gaskets to prevent damage to the riser or other existing fire protection equipment.
- E. Use ambient temperature water as the testing medium, except where there is a risk of damage due to freezing. Another liquid may be used with the piping system components.
- F. Use vents installed at high points in the system to release trapped air while filling the system. Use drains installed at low points for complete removal of the liquid after testing is complete.
- G. Examine system to see that equipment and parts that cannot withstand test pressures are properly isolated. Examine test equipment to ensure that it is tight and that low pressure filling lines are disconnected.
- H. Subject fire protection system to a hydrostatic test pressure which at every point in the system is not less than one and one half (1-1/2) times the design pressure. The test pressure shall not exceed the maximum pressure of any vessel, pump, valve, or other component in the system under test. Verify that the stress due to pressure at the bottom of vertical runs does not exceed either 90% of specified minimum yield strength, or 1.7 times the "SE" value in Appendix A of ASME B31.9, Code For Pressure Piping, Building Services Piping.
- I. After the hydrostatic test pressure has been applied for two (2) hours and with no allowable drop in pressure, the tested system or segment has passed the leak test. If after the two (2) hour test period there is a greater than a 5 psi change in pressure, the test has failed and the contractor shall examine piping, joints, and connections for leakage. After all leaks have been corrected by tightening, repairing, and/or replacing components as appropriate, the hydrostatic test shall be rescheduled with the University. Retesting can occur no sooner than five (5) days after a failed test. The test procedure shall be repeated as specified above until there are no leaks and there is less than a 5 psi change in pressure.
- J. Where backflow preventers are installed in piping systems scheduled for testing isolate the backflow preventer from the piping to be tested.

- K. The contractor shall furnish a written statement to the effect that all work covered under this contract has been completed and tested in accordance with specifications and plans. Copies of the written statement shall be provided to the Owner and the UMB Fire Marshal.

### 3.2 COMPLETED HYDROSTATIC/LEAK TEST FORMS

- A. Upon completion of each hydrostatic/leak test, the contractor shall upload the signed leak test forms to the Project File, in ebuilder, in Folder 11.06 Test Reports.

### 3.3 UMB STANDARD HYDROSTATIC/LEAK TEST SUMMARY FORMS

- A. General: Contractor shall use the “UMB Standard Pipe System Hydrostatic/Leak Test Summary Form.”
1. Sample Form: The following page contains a sample of the UMB Standard Pipe System Hydrostatic/Leak Test Summary Form.
  2. Availability: The standard test summary form is available on the UMB Web Site at: <http://www.umaryland.edu/designandconstruction/https://www.umaryland.edu/designandconstruction/design-and-construction-documents/umb-standard-project-forms---current-editions/>
  3. Field Testing: For field testing download and copy the forms from the UMB web site. **<Do not use attached “Sample Forms” for testing>**

**UMB STANDARD PIPE SYSTEM HYDROSTATIC/LEAK TEST SUMMARY FORM**

**TEST DATA:**

Date: \_\_\_\_\_ Project Number: \_\_\_\_\_

Location: \_\_\_\_\_

Pipe System Tested (Service): \_\_\_\_\_

Location and Description: \_\_\_\_\_

Pipe Materials: \_\_\_\_\_

Operating Pressure: \_\_\_\_\_

Specified Test Pressure: \_\_\_\_\_

Actual Test Pressure: \_\_\_\_\_

Pressure Test Type: \_\_\_\_\_

Test Start Time: \_\_\_\_\_ Recorded Test Pressure: \_\_\_\_\_

Test Completion Time: \_\_\_\_\_ Recorded Test Pressure: \_\_\_\_\_

Test Duration: \_\_\_\_\_ Pressure Drop or Rise: \_\_\_\_\_

Test Result (Pass/Fail): \_\_\_\_\_ Weather Conditions: \_\_\_\_\_

**SIGNATURES:**

Construction Manager: \_\_\_\_\_

Construction Manager Representative: \_\_\_\_\_

Mechanical Contractor: \_\_\_\_\_

Mechanical Contractor Forman: \_\_\_\_\_

UMB Division: \_\_\_\_\_

UMB Witness: \_\_\_\_\_

Remarks: \_\_\_\_\_

END OF SECTION 211101