

## PART 1 - GENERAL

### 1.1 GENERAL REQUIREMENTS

- .1 All conditions of the Contract apply to the work of this Section.

### 1.2 WORK INCLUDED

- .1 The Contractor shall hire and pay for the services of a NEBB Certified Cleanroom Performance Testing (CPT) Firm for this project.
- .2 This section provides the services required by the NEBB Certified Cleanroom Performance Testing (CPT) Firm hereinafter referred to as the NEBB CPT Firm, to measure and record the cleanroom conditions and resolve all nonconforming areas prior to attesting that the cleanroom is complete and ready for Owner's testing and occupancy.
- .3 At completion of the certification period, the Departmental Representative may engage the services of an independent quality assurance testing and certifying agency to perform random spot checks of all data collected during the NEBB CPT Firm's certifying period. This quality assurance agency, if used, will act only on behalf of the Departmental Representative to ensure that certification measurements and data are within industry tolerances and will verify that space conditions and system operations have not changed.
- .4 The NEBB CPT Firm shall perform the following tests described below:
- .1 Airflow Volume Tests
  - .2 ULPA Filter Integrity Inspection
  - .3 Room Particle Count Tests
  - .4 Enclosure Pressurization Tests
- .5 HEPA/ULPA Filter Repair and Replacement: If defective ceiling filters are identified during the course of the certification testing, the NEBB CPT Firm shall immediately notify the Contractor, and repair or replacement shall be performed at the direction of the CPT at no cost to the owner.
- .6 In the event of conflict regarding requirements for the referenced cleanroom testing and certification between this section and any other section, the provisions of this section shall govern.

### 1.3 REFERENCE STANDARDS

- .1 International Organization for Standardization (ISO)
- .1 International Standard ISO 14644 - Part 1 through Part 8 inclusive.
- .2 Institute of Environmental Sciences and Technology (IEST)
- .1 IES-RP-CC-006.2-1993, Testing Cleanrooms.
  - .2 IES-RP-CC-001.3-1993, HEPA and ULPA Filters.
- .3 National Environmental Balancing Bureau (NEBB)
- .1 NEBB Procedural Standards for Certified Testing of Cleanrooms, 3rd Edition - 2009.

1.4 SYSTEM  
DESCRIPTION

- .1 Definitions:
  - .1 As-Built Facility: Cleanroom which is complete and operating with all services connected and functioning, but which has no production equipment or operating personnel.
  - .2 At-Rest Facility: Cleanroom which is complete and has production equipment installed and operating, but which has no personnel.
  - .3 Operating Facility: Cleanroom in normal operation, including production equipment and personnel.
  - .4 Cleanroom Certifying Agency: The NEBB Certified Performance Testing (CPT) Firm.
  - .5 Balancing Agency: The NEBB Testing, Adjusting and Balancing (TAB) Firm.
  - .6 Quality Assurance Agency: The Owner's Cleanroom Quality Assurance Certifying Firm or agency.
- .2 Class of clean areas shall be as listed below:
  - .1 All Cleanroom areas: "As Built" Class 1000 and "At Rest" Class 10,000.

1.5 SITE  
CONDITIONS

- .1 Certification shall not proceed until all other work on the cleanroom has been completed and the commencement of certification work has been approved by the Departmental Representative.
- .2 Condition of Cleanroom prior to Testing:
  - .1 The HVAC system installation for the cleanroom, including all of the exhaust systems and make-up air systems associated with the cleanroom operation, shall have been completed, including all air and hydronic testing, adjusting and balancing work, and a TAB report submitted.
  - .2 All wall and ceiling penetrations sealed to airflow.
  - .3 All final clean down procedures shall be complete.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 The NEBB CPT Firm shall supply all (materials), tools, (equipment) and instrumentation required to perform the cleanroom system testing and certification as described in this section, including cleanroom garments required to maintain integrity of certification.

2.2 INSTRUMENTATION

- .1 Only state-of-the-art test equipment and instrumentation shall be used in the certification test procedures as described in Chapter 14 - Equipment and Instrumentation of the NEBB Procedural Standards for Certified Testing of Cleanrooms, 3rd Edition.
- .2 The test instrumentation shall be used as described in the certification test procedures found in the NEBB Procedural Standards for Certified Testing of Cleanrooms, 3rd Edition.

### **PART 3 - EXECUTION**

- 3.1 PREPARATION**
- .1 The NEBB CPT Firm shall supervise and conduct all tests in the presence of the Departmental Representative and the Contractor's representative.
  - .2 The as-built cleanroom certification tests shall be performed after the HVAC TAB work has been completed and the Departmental Representative is satisfied that the installation is ready for certification testing. Final clean down and commissioning procedures also shall be completed.
  - .3 All cleanroom recirculation fans, make-up air fans, process fume exhaust systems and automatic control loops shall be in operation during tests. All mechanical systems and all fans related to cleanroom systems shall be verified to be operating as specified and delivering design airflow.
  - .4 The NEBB Firm will work with the air balancing company for final adjustments to set up air flows and room pressures.
- 3.2 FIELD TESTING AND CERTIFYING PROCEDURES**
- .1 Airflow Volume Tests:
    - .1 1. Follow the cleanroom certification test procedures found in Chapter 5, Section 5.1.3 - Airflow Test Procedures of the NEBB Procedural Standards for Certified Testing of Cleanrooms, 3rd Edition - 2009.
  - .2 ULPA/HEPA Filter Integrity Inspection:
    - .1 Each ULPA/HEPA Filter shall be visually inspected for damage. The filter medium shall be inspected using the aerosol photometer test method of the NEBB CPT Procedural Standard. The Departmental Representative will determine whether any defective filter will be repaired or replaced.
  - .3 Room Particle Count Tests:
    - .1 Follow the cleanroom certification test procedures found in Chapter 7 - Room Cleanliness Classification Testing of the NEBB Procedural Standards for Certified Testing of Cleanrooms, Second Edition - 1996 and FED STD 209 E.
- 3.3 ACCEPTANCE CRITERIA**
- .1 Verification Procedures:
    - .1 If specified, the NEBB CPF Firm shall demonstrate to the Departmental Representative and Contractor's representatives the test instrumentation to be used and the certification performance test procedures to be followed.
    - .2 At the completion of all certification performance tests, the NEBB CPT Supervisor shall review all certification test data with the Departmental Representative and Contractor's representatives and establish the base operating condition of cleanrooms and clean spaces.
    - .3 Documentation:
      - .1 The NEBB CPT Supervisor shall review the certification test report data for compliance after each test, and then sign/stamp the final reports for submittal to the Departmental Representative and Contractor.