

## SECTION 15990: CLEANING AND TESTING

### PART 1 - GENERAL

#### 1.1 GENERAL:

Refer to Section 15010 for General Requirements for Mechanical Work.

#### 1.2 SCOPE:

1.2.1 This Contractor shall, at his own expense, during the progress of the work or upon its completion, make such tests of his work as are herein specified in accordance with all laws, governing authorities, or as are required by Architect or by state or municipal bureaus having jurisdiction and under their supervision. The Contractor shall provide all apparatus, temporary piping connections or any other requirements necessary for such tests. He shall take all due precautions to prevent damage to building or its contents incurred by such tests, as he will be required to repair and make good, at his own expense, any damage so caused. Any leaks, defects or deficiencies discovered as a result of the tests shall be immediately repaired or made good and test shall be repeated until the test requirements are fully complied with. No caulking of pipe joints to remedy leaks will be permitted.

1.2.2 No work of any nature shall be covered, enclosed or otherwise concealed until properly inspected, tested and approved. Any leaks which develop during any of the tests shall be corrected with new material and made as good as required; said tests shall be repeated until the work is satisfactory to Architect and the mechanical inspectors in every way.

1.2.3 Each separate system with its various components shall be operated by this Contractor for a reasonable length of time to demonstrate the performance of all equipment and piping in accordance with the true intent and purpose of the plans and specifications. All necessary adjustments shall be made to the satisfaction of the Architect.

1.2.4 All motor driven equipment shall be proved operable generally in accordance with the intent of these specifications.

1.2.5 All electrical power and water for testing of air conditioning and/or heating equipment and plumbing systems shall be provided by the General Contractor.

### PART 2 - PRODUCTS

#### 2.1 STERILIZATION MATERIALS:

Domestic water sterilization solutions shall contain not less than 50 parts per million of available chlorine. The chlorinating materials shall be either liquid chlorine, conforming to U. S. Army Specification Number 4-1, or calcium hypochlorite or chlorinated lime conforming to the requirements of Federal Specification 0-C-114.

### PART 3 - EXECUTION

#### 3.1 TESTING AND ADJUSTING:

3.1.1 Water Piping System: Water piping systems shall be properly tested to a hydrastatic pressure of two hundred pounds per square inch gauge (200 psi) for a period of not less than eight hours. During this test period, all leaks in pipe, fittings and accessories, and in the particular piping system which is being tested, shall be stopped and the hydrostatic test shall again be applied. This procedure shall be repeated for an entire eight hour period and no leaks can be found while the system being tested is subject to the pressure mentioned above.

3.1.2 Sanitary & Storm Drains: Pipe shall have all outlets temporarily plugged. The pipes shall be filled with water testing the system in sections such that no section shall be tested with less than 10 foot (10') head of water. If after twenty-four (24) hours, the level of the water has been lowered by leakage, the leaks must be found and stopped by this Contractor, and the water level shall again be raised and the test repeated until after twenty-four hour retention period there shall be no perceptible lowering of the water level of the system being tested.

3.1.3 Heating, Ventilating and Air Conditioning Systems: Each and every phase of the new air conditioning, heating and ventilating systems shall be operated separately, or in conjunction with the others for a period of time to demonstrate to the satisfaction of the Architect the ability of the equipment to meet the capacity and performance requirements while maintaining design conditions in accordance with the true intent and purpose of these specifications. Heating and cooling capacities and performance for every system shall be checked in the winter and summer, respectively. Any adjustments and/or startup required shall be done at no additional cost to the owner. Any adjustments done during one season shall not affect capacities and performance during the other season. The volume of air at each outlet and inlet, air conditioning equipment performance data, etc., shall be tabulated and required balancing performed by engineering personnel skilled, trained and experienced in the performance of these functions. Previous to such performance tests, this Contractor shall have set all valves, dampers, motors, controllers, thermostats, etc., and shall have the system operating and maintaining design temperatures, humidity and air circulation throughout all areas of the building. This Contractor shall also at the proper time make such additional adjustments as may be required to obtain consistent temperatures throughout the project. See Section 15995 of these specifications.

## 3.2 STERILIZATION:

3.2.1 After completion of the testing, the entire domestic cold and hot water piping systems with attached equipment shall be thoroughly sterilized with a solution containing not less than 50 parts per million of available chlorine as described above. The chlorinating materials shall be pumped into the system through the connection described below. The sterilization solution shall be allowed to remain in the system for a period of eight (8) hours, during which time all valves and faucets shall be opened and closed several times. After sterilization, the solution shall be flushed from the system with clean water until the residual chlorine content is not greater than 0.2 parts per million. The exact procedure actually used shall meet or exceed local code requirements.

3.2.2 The sterilization solution shall be introduced into the water system through a 3/4" opening to be provided in the water main on the house side of the water meter.

3.2.3 The sterilization process shall be conducted under the direction of the local health department and upon completion of the process, the health department shall test and verify the cleanliness of the water piping system.

## 3.3 NOISE LEVEL:

3.3.1 All items of equipment shown on the plans and specified herein have been selected so that the anticipated noise level in the building from the air conditioning and other systems will not be above 30NC level.

3.3.2 If the Contractor wishes to make substitution of equipment from that selected, he must satisfy himself and the Engineer that the noise level in the building will not exceed 30NC.

END OF SECTION