SECTION 22 08 00

**COMMISSIONING OF PLUMBING**

**BASED ON DFD MASTER SPECIFICATION DATED 12/1/16**

***This section has been written to cover most (but not all) situations that you will encounter. Depending on the requirements of your specific project, you may have to add material, delete items, or modify what is currently written. The Division of Facilities Development expects changes and comments from you.***

**P A R T 1 ‑ G E N E R A L**

**SCOPE**

This section includes commissioning forms for construction verification and functional performance testing. Included are the following topics:

PART 1 - GENERAL

Scope

Related Work

Reference

Submittals

PART 2 - PRODUCTS

(Not Used)

PART 3 – EXECUTION

***DO NOT INCLUDE ANY COMMISSIONING FORMS for PRELIMINARY review. Just edit the list below and only submit pages 22 08 00-1 through 22 08 00-2 with strikethroughs.***

Commissioning Forms

CV-22 05 14 Backflow Preventers

CV-22 07 00 Plumbing Insulation

CV-22 10 13 Facility Fuel Piping

CV-22 11 00 Facility Water Distribution

CV-22 13 00 Facility Sanitary Sewerage

CV-22 14 00 Facility Storm Drainage

CV-22 15 13 General Service Compressed Air Piping

CV-22 30 00 Acid Neutralization Basins

CV-22 30 00 Domestic Booster Pumps

CV-22 30 00 Expansion Tanks

CV-22 30 00 Inline Centrifugal Pumps

CV-22 30 00 Sewage Ejector Pumps

CV-22 30 00 Storage Tanks

CV-22 30 00 Sump Pumps

CV-22 30 00 Water Heaters (Electric)

CV-22 30 00 Water Heaters (Gas)

CV-22 30 00 Water Heaters (Steam)

CV-22 30-00 Water Softeners

CV-22 42 00 Commercial Plumbing Fixtures

CV-22 42 00 Electric Water Coolers

CV-22 50 00 Pool, Aquarium, and Fountain Plumbing Systems

CV-22 60 00 Air Compressors

CV-22 60 00 Laboratory and Medical Gas and Vacuum Systems

CV-22 60 00 Refrigerated Air Dryers

CV-22 60 00 Vacuum Pumps

CV-22 67 00 Processed Water Systems for Laboratories and Healthcare Facilities

FPT-22 30 00 Domestic Water Booster Pump

FPT-22 30 00 Inline Centrifugal Pump

FPT-22 30 00 Sewage Ejector Pumps

FPT-22 30 00 Sump Pumps

FPT-22 30 00 Water Heaters

**RELATED WORK**

Section 01 91 01 or 01 91 02 – Commissioning Process

**REFERENCE**

Applicable provisions of Division 1 shall govern work under this section.

**SUBMITTALS**

Reference the General Conditions of the Contract for submittal requirements.

Reference Section 01 91 01 or 01 91 02 Commissioning Process for Construction Verification Checklist and Functional Performance Test submittal requirements.

**P A R T 2 – P RO D U C T S**

(Not Used)

**P A R T 3 – E X E C U T I O N**

**COMMISSIONING FORMS**

Commissioning forms are to be filled in as work progresses by the individuals responsible for installation and shall be completed for each installation phase.

Provide a description of the work completed since the last entry, the percentage of the total work completed for the system for that area and the step of installation or finalization.

Circle Yes or No for each commissioning form item. If the information requested for an item does not apply to the given stage of installation for the system, list it as “N/A”. Explain all discrepancies, negative responses or N/A responses in the negative responses section.

Once the work is 100% complete and the responses to each item are complete and resolved for a given commissioning forms group, mark as complete, initial and date in the spaces provided.

Provide copies of the commissioning forms to the commissioning agent 2 days prior to construction progress meetings.

***Edit the individual construction verification checklists and provide additional checklists as needed to reflect the verification requirements of assemblies, components, equipment and systems to be commissioned on this project.***

***DO NOT INCLUDE ANY of the following***

***COMMISSIONING FORMS for PRELIMINARY review. Just edit the list in Part I above and only submit pages***

***22 08 00-1 through 22 08 00-2 with strikethroughs.***

**CV-22 05 14 – Backflow Preventers**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Configuration | | |  |  |
| 5 | Size (in) | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | All components present. | | | YES | NO |
| 3 | Installation and startup manual provided. | | | YES | NO |
| 4 | Regulated Object number affixed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit supported as required by manufacturer and specifications. | | | YES | NO |
| 2 | Equipment location coordinated with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances. | | | YES | NO |
| 3 | Adequate clearance around unit for service. | | | YES | NO |
| 4 | Floor drain / floor sink provided beneath or near unit. | | | YES | NO |
| 5 | Configuration and orientation of unit complies with labeling and literature from manufacturer, and DSPS code requirements. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *D* | *WATER PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Strainer provided prior to unit. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Piping is clean. | | | YES | NO |
| 5 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 6 | Piping insulation is complete, labeled, and installed as per specifications. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**CV-22 07 00 – Plumbing Insulation**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** | **9)** | **10)** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping clean, dry, pressure tested and approved prior to application of insulation.
2. Type and thickness of insulation complies with listed specification requirements for given system and pipe size.
3. Insulation installed with smooth and even surfaces, without the use of filler in voids.
4. Butt joints and longitudinal seams closed tightly with a minimum of 2” lap on jacket seams and 2” tape on butt joints.
5. Staples along seams and butt joints provided with vapor barrier mastic provided for staples on systems requiring vapor barrier.
6. **F**ull-length material used as possible, with no scrap piecing or stretching of insulation utilized.
7. Insulation continuous through sleeves and openings with vapor barriers continuous through all penetrations.
8. Complete vapor barrier provided for all cold water, storm water and piping systems with surface temperatures below 65ºF.
9. Exposed fiberglass insulation covered and sealed at all permanent terminations and at end of work day.
10. Piping and direction of flow is labeled per specification requirements.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**B) VALVE, FITTING & EQUIPMENT INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Fittings, valves, unions, flanges, couplings and specialties insulated with factory molded or built up insulation of the same thickness as adjoining insulation.
2. Insulated fittings, valves, unions, flanges, couplings and specialties covered with fabric reinforcing and mastic or where temperatures do not exceed 150°F, PVC fitting covers.
3. PVC fitting covers secured with tack fasteners and 1-1/2” band of mastic over ends, throat, seams or penetrations or for systems requiring vapor barrier, vapor barrier mastic.
4. Equipment access manholes, fittings, nameplates or ASME stamps left uninsulated with insulation beveled and sealed at these locations.
5. Equipment insulation installed with smooth and even surfaces per specifications requirements.
6. No insulation provided at chrome plated exposed supplies and stops (except where specifically noted), water hammer arrestors, and piping unions and flanges for piping systems not requiring a vapor barrier.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**CV-22 10 13 – Facility Fuel Piping**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**A) PRE-INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All piping, valves, etc. are clean and free of damage prior to installation.
2. Temporary protective coating is provided on cast iron and steel valves during storage.
3. Temporary end caps are provided on piping and fittings until installation.
4. Contractors installing fuel oil piping in the City of Madison are approved installers by the Madison Fire Department and plans have been submitted and approved by the Madison Fire Department.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**B) GENERAL PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping is free to expand and contract without noise or damage to hangers, joints, or the building.
2. Changes in pipe sizes are made with the proper size reducing fittings, reducing elbow or reducing tees, and no bushings are utilized.
3. Pipe hanger spacing complies with specification requirements.
4. All equipment requiring maintenance is accessible (valves, etc.).
5. Piping allows access to equipment that is part of this system or another system.
6. Piping is not run through any plenums rated for ventilation.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**C) FUEL OIL PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Double or triple swing joints provided in the pipe lines connected to underground fuel oil tanks, except straight fill lines and test wells, to permit the tanks to settle without impairing the tightness of the pipe connections.
2. Tank fill piping terminated at least two feet from any building wall.
3. Vent pipe pitched to drain toward tank without sags or traps in which liquid may collect.
4. Where two or more tanks are indicated to be vented through a common line, the point of connection between the individual vent lines is not be lower than the top of any fill pipe opening.
5. All vent pipes terminated outside of the building, not less than two feet measured vertically or horizontally from any building opening, not less than twenty five feet from any outside air intake louver, and with a weatherproof and flameproof vent cap or hood.
6. Flexible piping connections installed in supply and return lines at each engine.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**D) NATURAL GAS PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. 4" minimum depth dirt leg installed at the bottom of each vertical run and at each appliance.
2. All branch connections to the main branched from the top or side of the main.
3. If an above ground vent terminates in an area subject to snow accumulation, line terminated at least five feet above grade.
4. Each gas pressure reducing valve vent and relief valve vent run separately to a point outside of the building, terminated with a screened vent cap, and located according to gas utility regulations.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**E) VALVE & FITTING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All welded piping cleaned before all regulators and control valves by placing target cloth over piping and blowing compressed air through line until cloth is clean and free of debris.
2. All valves are in an upright vertical position with handles in a horizontal position and fully operated without removal or alteration of handle.
3. Isolation valves provided at all equipment connections, main branches and sub-branches.
4. Horizontal fuel oil supply, return, gauge and vent pipes are at least 18" below grade at its highest point and slopes 1/4" per foot upwards from the tank or special monitoring.
5. Fuel oil return line from each engine to the main oil tank or the day tank contains no manual or automatic valves to restrict the flow.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**F) TESTING CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping tested utilizing air at specified pressure and duration as per specification for given fuel type.
2. All leaks identified during testing have been repaired and test re-done until satisfactory conditions are accomplished.
3. Test conducted with all piping of tested system or section visible during testing.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**G) FINALIZATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All exposed piping which passes through a wall, ceiling or floor is provided with escutcheon plates.
2. Piping labels and direction of flow is provided per specification requirements.
3. All penetrations through fire rated wall assemblies have been sealed per specification requirements.
4. All penetrations through non-rated wall assemblies have been sealed per specification requirements for given space type.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**CV-22 11 00 – Facility Water Distribution**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**A) PRE-INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All piping, valves, etc. are clean and free of damage prior to installation.
2. Temporary protective coating is provided on cast iron and steel valves during storage.
3. Temporary end caps are provided on piping and fittings until installation.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**B) GENERAL PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** | **9)** | **10)** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping is free to expand and contract without noise or damage to hangers, joints, or the building.
2. Piping is installed in a manner to ensure that insulation will not contact adjacent surfaces.
3. Piping is installed with sufficient pitch and arranged in a manner to ensure drainage of entire system.
4. Changes in pipe sizes are made with the proper size reducing fittings, reducing elbow or reducing tees, and no bushings are utilized.
5. Connections between dissimilar pipe materials are made with dielectric fittings.
6. Pipe hanger spacing complies with specification requirements.
7. All equipment requiring maintenance is accessible (valves, strainers, etc.).
8. Piping allows access to equipment that is part of this system or another system.
9. Water piping not installed within exterior walls.
10. Open pipe ends capped at completion of work day.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**C) UNDERGROUND PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Exterior water piping installed below predicted frost level in accordance with SPS Table 382.30-6, but in no case less than 6' bury depth to top of pipe.
2. Minimum of 8' horizontal distance maintained between 2-1/2" and larger water piping and sanitary sewer piping.
3. Minimum of 30" horizontal and 12" vertical distance, water on top, maintained between 2" and smaller water piping and sanitary sewer piping.
4. Where water piping crosses a sanitary sewer, minimum 18" vertical clearance add waterproof PVC water pipe sleeve (reference sanitary sewer materials) sealed at both ends for distance of 10' from sewer in both directions provided.
5. Thrust restraints provided for 3" and larger exterior water piping joints, hydrants, caps, plugs, fittings and bends of 22-1/2 degrees or more.
6. Excavation and backfill meet specification requirements.
7. Underground warning tape installed 6"-12" below finished grade above all exterior below ground piping.
8. Pipe and fittings encased in a polyethylene wrap per specification.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**D) VALVE & FITTING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All valves are in a horizontal or upright vertical position (not inverted) with handles in an accessible position.
2. Valve handle extensions are provided where needed per the specification.
3. Drainage valves provided at all low points and downstream of riser isolation valves.
4. Isolation valves provided at all equipment connections, main branches and sub-branches, “T” connections, and as necessary for repairing the system as specified in contract documents.
5. Riser shutoff valve and a capped hose thread drain valve at the bottom of each riser provided.
6. All strainers in piping system have ball valves installed at the tapped screen retainer.
7. Yard and wall hydrants installed with discharge above minimum grade clearance requirements noted in specifications.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**E) TESTING CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping tested utilizing water at specified pressure and duration as per specification.
2. All leaks identified during testing have been repaired and test re-done until satisfactory conditions are accomplished.
3. Test conducted with all piping of tested system or section visible during testing.
4. Proceeding system chlorination, all outlets flushed for a minimum of 1 minute with clean water until water runs clear.
5. Following initial flush system filled with water and chlorine at 50 PPM and allowed to stand for 24 hours, or system filled and with a water solution containing at least 200 PPM of chlorine and allowed to stand for 3 hours.
6. Following specification prescribed stand times for chlorine treatment system flushed until chlorine levels are at source water levels.
7. 24 hours after final flushing, water samples of the number and location specified by the Engineer taken for lab testing and results show the absence of coliform bacteria.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**F) FINALIZATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All exposed piping which passes through a wall, ceiling or floor is provided with escutcheon plates.
2. Piping labels and direction of flow is provided per specification requirements.
3. All penetrations through fire rated wall assemblies have been sealed per specification requirements.
4. All penetrations through non-rated wall assemblies have been sealed per specification requirements for given space type.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**CV-22 13 00 – Facility Sanitary Sewerage**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**A) PRE-INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All piping meets ASTM standards and specifications.
2. All piping, etc. is clean and free of damage prior to installation.
3. Temporary protective covering is provided on pipe and fittings during storage.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**B) GENERAL PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** |  | | | | | | | | | | | | | **Questions (See details below)** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1)** | | **2)** | **3)** | **4)** | | **5)** | **6)** | | **7)** | **8)** | **9)** | | **10)** |
|  |  |  |  |  | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** |
|  |  |  |  |  | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** |
|  |  |  |  |  | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** |
|  |  |  |  |  | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** |
|  |  |  |  |  | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** |
|  |  |  |  |  | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** |
|  |  |  |  |  | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** |
|  |  |  |  |  | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** |
|  |  |  |  |  | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** |
|  |  |  |  |  | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | | **YES**  **NO** |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | | **DATE:** | | |  | | | |  | | |

**Question Details**

1. Piping is free to expand and contract without noise or damage to hangers, joints, or the building.
2. Piping is installed with sufficient pitch and arranged in a manner to ensure drainage of entire system.
3. Interior piping pitched to drain at minimum slope of 1/4" per foot where possible and in no case less than 1/8" per foot for piping 3" and larger.
4. Changes in pipe sizes are made with the proper size reducing fittings, reducing elbow or reducing tees, and no bushings are utilized.
5. Pipe hanger spacing complies with specification requirements.
6. All equipment requiring maintenance is accessible (valves, strainers, etc.).
7. Drains and cleanouts level and plumb to finished floor, roof or finished wall.
8. Minimum clearance of 18” provided for all cleanouts and backwater valves.
9. Open pipe ends capped at completion of work day.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**C) UNDERGROUND PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Exterior piping installed below predicted frost level, but in no case less than 5' bury depth to top of pipe.
2. Minimum of 8' horizontal distance maintained between 2-1/2" and larger water piping and sanitary sewer piping.
3. Minimum of 30" horizontal and 12" vertical distance, water on top, maintained between 2" and smaller water piping and sanitary sewer piping.
4. Where water piping crosses a sanitary sewer, minimum 18" vertical clearance and waterproof PVC water pipe sleeve (reference sanitary sewer materials) sealed at both ends for distance of 10' from sewer in both directions provided.
5. Excavation and backfill procedures meet specification requirements.
6. Piping bedding and backfill materials meet specification requirements.
7. Underground warning tape installed 6"-12" below finished grade above all exterior below ground piping.
8. Non-metallic piping has tracer wire installed per Wisconsin Administrative Plumbing Codes.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**D) TESTING & FINALIZATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping tested utilizing water at specified pressure and duration as per specification for given piping system type.
2. All leaks identified during testing have been repaired and test re-done until satisfactory conditions are accomplished.
3. Test conducted with all piping of tested system or section visible during testing.
4. Entire testing procedure witnessed by DFD Representative per the specifications.
5. Piping inlets (floor drains, hub drains, mop basins, fixtures, etc.) flushed with high flow of water at completion of project to demonstrate full flow capacity.
6. Blockages removed and necessary repairs made where flow is found to be impeded during flushing test.
7. Piping identification and direction of flow is provided per specification requirements.
8. All penetrations through fire rated wall assemblies have been sealed per specification requirements.
9. All penetrations through non-rated wall assemblies have been sealed per specification requirements for given space type.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**CV-22 14 00 – Facility Storm Drainage**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**A) PRE-INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping materials meet specified ASTM standards and the specifications.
2. All piping, etc. is clean and free of damage prior to installation.
3. Temporary protective covering is provided on pipe and fittings during storage.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**B) GENERAL PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** | **9)** | **10)** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping is free to expand and contract without noise or damage to hangers, joints, or the building.
2. Piping is installed in a manner to ensure that insulation will not contact adjacent surfaces.
3. Piping is installed with sufficient pitch and arranged in a manner to ensure drainage of entire system.
4. Changes in pipe sizes are made with the proper size reducing fittings, reducing elbow or reducing tees, and no bushings are utilized.
5. Connections between dissimilar pipe materials are made with approved fittings.
6. Pipe hanger spacing complies with specification requirements.
7. All equipment requiring maintenance is accessible.
8. Piping allows access to equipment that is part of this system or another system.
9. Minimum clearance of 18” provided for all cleanouts.
10. Open pipe ends capped at completion of work day.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**C) UNDERGROUND PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Exterior piping installed below predicted frost level, but in no case less than 5' bury depth to top of pipe.
2. Excavation and backfill procedures meet specification requirements.
3. Bedding and backfill material meet specifications.
4. Tracer wire is installed on non-metallic piping.
5. Underground warning tape installed 6"-12" below finished grade above all exterior below ground piping.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**D) TESTING & FINALIZATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping tested utilizing water at specified pressure and duration as per specification for given piping system type.
2. All leaks identified during testing have been repaired and test re-done until satisfactory conditions are accomplished.
3. Test conducted with all piping of tested system or section visible during testing.
4. All testing procedures witnessed by DFD representative.
5. Piping identification and direction of flow is provided per specification requirements.
6. All penetrations through fire rated wall assemblies have been sealed per specification requirements.
7. All penetrations through non-rated wall assemblies have been sealed per specification requirements for given space type.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**22 15 13 – General Service Compressed Air Piping**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**A) PRE-INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All pipe materials and fittings meet the specifications.
2. All piping, valves, etc. are clean and free of damage prior to installation.
3. Temporary protective coating is provided on steel valves during storage.
4. Temporary end caps are provided on piping and fittings until installation.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**B) PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** | **9)** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping is secured to assure damage to hangers, joints, or the building structure does not take place.
2. Piping is installed with sufficient pitch and arranged in a manner to ensure drainage of entire system.
3. Changes in pipe sizes are made with the proper size reducing fittings, reducing elbow or reducing tees, and no bushings are utilized.
4. 4" minimum depth dirt leg installed at the bottom of each vertical run and at each outlet connection with shutoff valve at bottom of dirt leg.
5. Pipe hanger spacing complies with specification requirements.
6. All valves are in an upright vertical position with handles in a horizontal position and fully operated without removal or alteration of handle.
7. Isolation valves provided at all equipment connections, main branches and sub-branches, “T” connections, and as necessary for repairing the system as specified in contract documents.
8. Vibration isolation is installed where identified in the contract documents.
9. Open pipe ends capped at completion of work day.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**E) TESTING & FINALIZATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping tested at 150 psig for a duration of 24 hours with air.
2. All leaks identified during testing have been repaired and test re-done until no leaks are present.
3. Test conducted with all piping of tested system or section visible during testing.
4. All exposed piping which passes through a wall, ceiling or floor is provided with escutcheon plates.
5. Piping labels and direction of flow is provided per specification requirements.
6. All penetrations through fire rated wall assemblies have been sealed per specification requirements.
7. All penetrations through non-rated wall assemblies have been sealed per specification requirements for given space type.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**22 30 00 – Acid Neutralization Basins**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Storage Capacity (gal.) | | |  |  |
| 5 | Base Material | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | Openings are sealed with plastic plugs. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Trench sized per manufacturer recommendations. | | | YES | NO |
| 2 | A concrete vault or a specially designed tank used in areas with high water tables or poor soil conditions. | | | YES | NO |
| 3 | Compacted bedding of thickness and material specified by manufacturer provided. | | | YES | NO |
| 4 | Piping arranged for ease of unit removal. | | | YES | NO |
| 5 | Piping supported as required by specifications. | | | YES | NO |
| 6 | Piping is clean. | | | YES | NO |
| 7 | Unit filled with water prior to backfilling. | | | YES | NO |
| 8 | Manhole and cover extended to finished grade level. | | | YES | NO |
| 9 | Covers designed to installed “flush with floor” have been extended to finish floor level and surrounded by 4”-6” thick concrete pad. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | **INITIALS:** | | |  | **DATE:** |
| *D* | | *STARTUP* |  |  |  |
| 1 | For units utilizing limestone as base material, water has been added to unit prior to introduction of limestone. | | | | | YES | NO |
| 2 | Base material added to level as defined by contract documents. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | **INITIALS:** | | |  | **DATE:** |
|  | |  |  |  |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**22 30 00 – Domestic Booster Pumps**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Pump Type | | |  |  |
| 5 | # of Pumps | | |  |  |
| 6 | Total System Capacity (gpm) | | |  |  |
| 7 | Minimum Suction Pressure / Discharge Pressure (psig / psig) | | | **/** | **/** |
| 8 | Inlet / Outlet Size (in) | | | **/** | **/** |
| 9 | Capacity per Pump (gpm) | | |  |  |
| 10 | Head per Pump (ft w.g.) | | |  |  |
| 11 | Motor Speed per Pump (rpm) | | |  |  |
| 12 | Motor Power per Pump (hp) | | |  |  |
| 13 | Voltage / Phase / Frequency (V / - /Hz) | | | **/ /** | **/ /** |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | Openings are sealed with plastic. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| 6 | Manufacturer’s ratings readable/accurate | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Unit is set on concrete housekeeping pad and is level. | | | YES | NO |
| 3 | Unit is isolated from the building structure (to reduce vibration and noise) | | | YES | NO |
| 4 | Equipment location coordinated with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances. | | | YES | NO |
| 5 | Adequate clearance around unit for service. | | | YES | NO |
| 6 | All components accessible for maintenance. | | | YES | NO |
| 7 | Unit labeled and is easy to see. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *D* | *WATER PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Piping is clean. | | | YES | NO |
| 5 | Unit connected to water supply piping using unions or flanges and isolation valves. | | | YES | NO |
| 6 | Dielectric fittings installed to isolate dis-similar pipe materials. | | | YES | NO |
| 7 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 8 | Thermometers and pressure gauges supplied on suction and lines. | | | YES | NO |
| 9 | Piping insulation is complete and installed as per specifications. | | | YES | NO |
| 10 | All valves and test ports are easily accessible. | | | YES | NO |
| 11 | Valve tags attached. | | | YES | NO |
| 12 | Pressure and temperature relief valve(s) for correct pressure and temperature installed. | | | YES | NO |
| 13 | Pressure and temperature relief valve(s) piped with sufficient pipe diameter to drain designed for boiling water. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *ELECTRICAL* | | | | |
| 1 | Local disconnect installed in accessible and visible location. | | | YES | NO |
| 2 | Each motor terminal box is connected with a minimum 12", maximum 36" piece of flexible conduit to a fixed junction box. | | | YES | NO |
| 3 | Motor rotation in the proper direction. | | | YES | NO |
| 4 | All electrical connections are tight. | | | YES | NO |
| 5 | All electrical components are grounded. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *F* | *CONTROLS INSTALLATION* | | | | |
| 1 | Remote start and stop wiring installed and communication verified. | | | YES | NO |
| 2 | Remote status wiring installed and communication verified. | | | YES | NO |
| 3 | Remote alarm wiring installed and communication verified. | | | YES | NO |
| 4 | Differential pressure switch installed and communication verified (if applicable). | | | YES | NO |
| 5 | Pressure transmitter wiring installed and communication verified. | | | YES | NO |
| 6 | Temperature sensor wiring installed and communication verified. | | | YES | NO |
| 7 | Flow sensor wiring installed and communication verified (if applicable). | | | YES | NO |
| 8 | Low level control wiring installed and communication verified (if applicable). | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *G* | *MECHANICAL STARTUP* | | | | |
| 1 | Pumps checked, aligned, and certified prior to startup and report submitted. | | | YES | NO |
| 2 | Pumps and motors lubricated before startup. | | | YES | NO |
| 3 | Pump shafts rotate easily with power turned off. | | | YES | NO |
| 4 | System flushed, filled, and air purged. | | | YES | NO |
| 5 | Pressure and temperature relief valve(s) set to proper pressure and temperature and manually checked for functionality. | | | YES | NO |
| 6 | System starts and runs without any unusual noise or vibration. | | | YES | NO |
| 7 | Manufacturer's startup checklist completed and attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *H* | *CONTROLS STARTUP* | | | | |
| 1 | Unit controller programmed per contract documents and manufacturer recommendations. | | | YES | NO |
| 2 | Unit controller accurately depicts condition of unit and pumps. | | | YES | NO |
| 3 | Remote start and stop sequence verified and acceptable. | | | YES | NO |
| 4 | Lead/lag sequence verified and acceptable. | | | YES | NO |
| 5 | Pressure boost sequence verified and acceptable. | | | YES | NO |
| 6 | Low level control sequence verified and acceptable (if applicable). | | | YES | NO |
| 7 | High and low suction pressure sequences verified and acceptable. | | | YES | NO |
| 8 | High and low system pressure sequences verified and acceptable. | | | YES | NO |
| 9 | Control wiring labeled per specification requirements. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**22 30 00 – Expansion Tanks**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Capacity (gallons). | | |  |  |
| 5 | Maximum pressure (psi). | | |  |  |
| 6 | Tank suitable for us with potable water. | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | Openings are sealed with plastic plugs. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| 6 | Manufacturer’s ratings readable/accurate | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Unit support is independent of adjacent piping. | | | YES | NO |
| 3 | Adequate clearance around unit for service. | | | YES | NO |
| 4 | All components accessible for maintenance. | | | YES | NO |
| 5 | Unit labeled and is easy to see. | | | YES | NO |
| 6 | Unit charged to correct operating pressure per contract documents. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *D* | *PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Unit connected to water supply and drain piping using unions or flanges and isolation valves. | | | YES | NO |
| 5 | Piping is clean. | | | YES | NO |
| 6 | Dielectric fittings installed to isolate dissimilar pipe materials. | | | YES | NO |
| 7 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 8 | Piping insulation is complete and installed as per specifications. | | | YES | NO |
| 9 | All valves and test ports are easily accessible. | | | YES | NO |
| 10 | Valve tags attached. | | | YES | NO |
| 11 | Drain valve provided. | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *MECHANICAL STARTUP* | | | | |
| 1 | System flushed, filled, and air purged. | | | YES | NO |
| 2 | Unit has been charged to pressure specified by drawings and application. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**22 30 00 – Inline Centrifugal Pumps**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Pump Type | | |  |  |
| 5 | Inlet / Outlet Size (in) | | | **/** | **/** |
| 6 | Impeller Diameter (in) | | |  |  |
| 7 | Capacity / Head (gpm / ft w.g.) | | | **/** | **/** |
| 8 | Motor Speed / Power (rpm / hp) | | | **/** | **/** |
| 9 | Voltage / Phase / Frequency (V / - /Hz) | | | **/ /** | **/ /** |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | Openings are sealed with plastic. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| 6 | Manufacturer’s ratings readable/accurate | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Equipment location coordinated with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances. | | | YES | NO |
| 3 | Adequate clearance around unit for service. | | | YES | NO |
| 4 | All components accessible for maintenance. | | | YES | NO |
| 5 | Unit labeled and is easy to see. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *D* | *WATER PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Piping is clean. | | | YES | NO |
| 5 | Unit connected to water system return piping using unions or flanges and isolation valves. | | | YES | NO |
| 6 | Dielectric fittings installed to isolate dissimilar pipe materials. | | | YES | NO |
| 7 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 8 | Thermometers and pressure gauges supplied on supply and return lines. | | | YES | NO |
| 9 | Piping insulation is complete and installed as per specifications. | | | YES | NO |
| 10 | All valves and test ports are easily accessible. | | | YES | NO |
| 11 | Valve tags attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *ELECTRICAL* | | | | |
| 1 | Local disconnect installed in accessible and visible location. | | | YES | NO |
| 2 | Each motor terminal box is connected with a minimum 12", maximum 36" piece of flexible conduit to a fixed junction box. | | | YES | NO |
| 3 | Motor rotation in the proper direction. | | | YES | NO |
| 4 | All electrical connections are tight. | | | YES | NO |
| 5 | All electrical components are grounded. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *F* | *CONTROLS INSTALLATION (if applicable)* | | | | |
| 1 | Remote start and stop wiring installed and communication verified. | | | YES | NO |
| 2 | Remote status wiring installed and communication verified. | | | YES | NO |
| 3 | Aqua-stat wiring installed and communication verified. | | | YES | NO |
| 4 | Timer wiring installed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *G* | *MECHANICAL STARTUP* | | | | |
| 1 | Unit checked, aligned, and certified prior to startup and report submitted. | | | YES | NO |
| 2 | Unit and motor lubricated before startup. | | | YES | NO |
| 3 | Pump shaft rotates easily with power turned off. | | | YES | NO |
| 4 | System flushed, filled, and air purged. | | | YES | NO |
| 5 | System starts and runs without any unusual noise or vibration. | | | YES | NO |
| 6 | Manufacturer's startup checklist completed and attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *H* | *CONTROLS STARTUP (if applicable)* | | | | |
| 1 | Aqua-stat temperature set point set and verified. | | | YES | NO |
| 2 | Lead/lag sequence verified and acceptable. | | | YES | NO |
| 3 | Timer schedule programmed and operation verified. | | | YES | NO |
| 4 | Control wiring labeled per specification requirements. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**22 30 00 – Sewage Elector Pumps**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Impeller Diameter (in) | | |  |  |
| 5 | Outlet Size (in) | | |  |  |
| 6 | Capacity / Head (gpm / ft w.g.) | | | **/** | **/** |
| 7 | Motor Speed / Power (rpm / hp) | | | **/** | **/** |
| 8 | Voltage / Phase / Frequency (V / - /Hz) | | | **/ /** | **/ /** |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | Openings are sealed with plastic. | | | YES | NO |
| 3 | All components and accessories present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| 6 | Manufacturer’s ratings readable/accurate | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Adequate clearance around unit for service. | | | YES | NO |
| 3 | All components accessible for maintenance. | | | YES | NO |
| 4 | Unit labeled and is easy to see. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Piping is clean. | | | YES | NO |
| 5 | Mix-flush valve installed per manufacturer instructions. | | | YES | NO |
| 6 | Unit connected to drain piping using unions or flanges and isolation valves. | | | YES | NO |
| 7 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 8 | All valves and test ports are easily accessible. | | | YES | NO |
| 9 | Valve tags attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *ELECTRICAL* | | | | |
| 1 | Local disconnect installed in accessible and visible location. | | | YES | NO |
| 2 | Motor rotation in the proper direction. | | | YES | NO |
| 3 | All electrical connections are tight. | | | YES | NO |
| 4 | All electrical components are grounded. | | | YES | NO |
| 5 | Electrical conduit and conductor penetrations of sump are air and water tight. | | | YES | NO |
| 6 | Electrical connections in sump are water tight. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *F* | *CONTROLS INSTALLATION* | | | | |
| 1 | Control and alarm floats installed at heights defined in contract documents. | | | YES | NO |
| 2 | Control and alarm floats wiring installed and communication verified. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *G* | *MECHANICAL STARTUP* | | | | |
| 1 | Unit checked, aligned, and certified prior to startup and report submitted. | | | YES | NO |
| 2 | Unit and motor lubricated before startup. | | | YES | NO |
| 3 | Unit shaft rotates easily with power turned off. | | | YES | NO |
| 4 | Sump is clean. | | | YES | NO |
| 5 | System starts and runs without any unusual noise or vibration. | | | YES | NO |
| 6 | Manufacturer's startup checklist completed and attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *H* | *CONTROLS STARTUP (if applicable)* | | | | |
| 1 | High level alarm sequence verified and acceptable. | | | YES | NO |
| 2 | Level control sequence verified and acceptable. | | | YES | NO |
| 3 | Off sequence verified and acceptable. | | | YES | NO |
| 4 | Sump cleaning sequence verified and acceptable. | | | YES | NO |
| 5 | Motor moisture protection sequence verified and acceptable. | | | YES | NO |
| 6 | Motor thermal protection sequence verified and acceptable. | | | YES | NO |
| 7 | Control wiring labeled per specification requirements. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**22 30 00 – Storage Tanks**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Working Pressure (psi) | | |  |  |
| 5 | Storage Capacity (gal.) | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | The openings are sealed with plastic plugs. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Unit is set on concrete housekeeping pad and is level. | | | YES | NO |
| 3 | Equipment location coordinated with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances. | | | YES | NO |
| 4 | Adequate clearance around unit for service and filling. | | | YES | NO |
| 5 | All components accessible for maintenance. | | | YES | NO |
| 6 | Unit labeled and is easy to see. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *D* | *PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Piping is clean. | | | YES | NO |
| 5 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 6 | Piping insulation is complete and installed as per specifications. | | | YES | NO |
| 7 | All valves and test ports are easily accessible. | | | YES | NO |
| 8 | Valve tags attached. | | | YES | NO |
| 9 | Pressure and temperature relief valve(s) for correct pressure and temperature installed (if applicable). | | | YES | NO |
| 10 | Pressure and temperature relief valve(s) piped with sufficient pipe diameter to drain designed for boiling water (if applicable). | | | YES | NO |
| 11 | Drain valve provided. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *MECHANICAL STARTUP* | | | | |
| 1 | System flushed, filled, and air purged. | | | YES | NO |
| 2 | Pressure and temperature relief valve(s) set to proper pressure and temperature and manually checked for functionality (if applicable). | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**CV-22 30 00 – Sump Pumps**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Impeller Diameter (in) | | |  |  |
| 5 | Outlet Size (in) | | |  |  |
| 6 | Capacity / Head (gpm / ft w.g.) | | |  |  |
| 7 | Motor Speed / Power (rpm / hp) | | |  |  |
| 8 | Voltage / Phase / Frequency (V / - /Hz) | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | Openings are sealed with plastic. | | | YES | NO |
| 3 | All components and accessories present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| 6 | Manufacturer’s ratings readable/accurate | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Adequate clearance around unit for service. | | | YES | NO |
| 3 | All components accessible for maintenance. | | | YES | NO |
| 4 | Unit labeled and is easy to see. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Piping is clean. | | | YES | NO |
| 5 | Unit connected to drain piping using unions or flanges and isolation valves. | | | YES | NO |
| 6 | Unit drain piping routed to open sight drain (elevator sump installations only) | | | YES | NO |
| 7 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 8 | All valves and test ports are easily accessible. | | | YES | NO |
| 9 | Valve tags attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *ELECTRICAL* | | | | |
| 1 | Local disconnect installed in accessible and visible location. | | | YES | NO |
| 2 | Motor rotation in the proper direction. | | | YES | NO |
| 3 | All electrical connections are tight. | | | YES | NO |
| 4 | All electrical components are grounded. | | | YES | NO |
| 5 | Electrical conduit and conductor penetrations of sump are air and water tight. | | | YES | NO |
| 6 | Electrical connections in sump are water tight. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *F* | *CONTROLS INSTALLATION* | | | | |
| 1 | Control and alarm floats installed at heights defined in contract documents. | | | YES | NO |
| 2 | Control and alarm floats wiring installed and communication verified. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *G* | *MECHANICAL STARTUP* | | | | |
| 1 | Unit checked, aligned, and certified prior to startup and report submitted. | | | YES | NO |
| 2 | Unit and motor lubricated before startup. | | | YES | NO |
| 3 | Unit shaft rotates easily with power turned off. | | | YES | NO |
| 4 | Sump is clean. | | | YES | NO |
| 5 | System starts and runs without any unusual noise or vibration. | | | YES | NO |
| 6 | Manufacturer's startup checklist completed and attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *H* | *CONTROLS STARTUP (if applicable)* | | | | |
| 1 | High level alarm sequence verified and acceptable. | | | YES | NO |
| 2 | Level control sequence verified and acceptable. | | | YES | NO |
| 3 | Off sequence verified and acceptable. | | | YES | NO |
| 4 | Motor moisture protection sequence verified and acceptable. | | | YES | NO |
| 5 | Motor thermal protection sequence verified and acceptable. | | | YES | NO |
| 6 | Control wiring labeled per specification requirements. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**CV-22 30 00 – Water Heaters (Electric)**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Heating Input (kW) | | |  |  |
| 5 | Voltage / Phase / Frequency (V / - / Hz) | | |  |  |
| 6 | Storage Capacity (gal.) | | |  |  |
| 7 | Recovery capacity at 100 deg. F rise (gph) | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | Water and gas openings are sealed with plastic plugs. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Equipment location coordinated with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances. | | | YES | NO |
| 3 | Unit is set on concrete housekeeping pad and is level (commercial units ONLY). | | | YES | NO |
| 4 | Adequate clearance around unit for service. | | | YES | NO |
| 5 | All components accessible for maintenance. | | | YES | NO |
| 6 | Drain pan installed and piped to an adequate drain. | | | YES | NO |
| 7 | Proper clearances from combustible surfaces maintained per manufacturer’s instructions and applicable codes. | | | YES | NO |
| 8 | Unit labeled and is easy to see. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *D* | *WATER PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Piping is clean. | | | YES | NO |
| 5 | Unit connected to water supply and return/make-up piping using unions or flanges and isolation valves. | | | YES | NO |
| 6 | Dielectric fittings installed to isolate dissimilar pipe materials. | | | YES | NO |
| 7 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 8 | Thermometers and pressure gauges supplied on supply and return lines. | | | YES | NO |
| 9 | Piping insulation is complete and installed as per specifications. | | | YES | NO |
| 10 | All valves and test ports are easily accessible. | | | YES | NO |
| 11 | Valve tags attached. | | | YES | NO |
| 12 | Pressure and temperature relief valve(s) for correct pressure and temperature installed. | | | YES | NO |
| 13 | Pressure and temperature relief valve(s) piped with sufficient pipe diameter to drain designed for boiling water. | | | YES | NO |
| 14 | Drain valve installed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *ELECTRICAL* | | | | |
| 1 | Local disconnect installed in accessible and visible location. | | | YES | NO |
| 2 | All electrical connections are tight. | | | YES | NO |
| 3 | All electrical components are grounded. | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *F* | *MECHANICAL STARTUP* | | | | |
| 1 | System flushed, filled, and air purged. | | | YES | NO |
| 2 | Temperature setting adjusted to correct temperature per contract documents. | | | YES | NO |
| 3 | Pressure and temperature relief valve(s) set to proper pressure and temperature and manually checked for functionality. | | | YES | NO |
| 4 | Manufacturer's startup checklist completed and attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**CV-22 30 00 – Water Heaters (Gas)**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Heating Input / Output (MBH / MBH) | | |  |  |
| 5 | Voltage / Phase / Frequency (V / - / Hz) | | | **/ /** | **/ /** |
| 6 | Storage Capacity (gal.) | | |  |  |
| 7 | Recovery capacity at 100 deg. F rise (gph) | | |  |  |
| 8 | Fuel Type | | |  |  |
| 9 | Gas Inlet Pressure (psig) | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | The water and gas openings are sealed with plastic plugs. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Equipment location coordinated with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances. | | | YES | NO |
| 3 | Unit is set on concrete housekeeping pad and is level (commercial units ONLY). | | | YES | NO |
| 4 | Adequate clearance around unit for service. | | | YES | NO |
| 5 | All components accessible for maintenance. | | | YES | NO |
| 6 | Drain pan installed and piped to an adequate drain. | | | YES | NO |
| 7 | Proper clearances from combustible surfaces maintained per manufacturer’s instructions and applicable codes. | | | YES | NO |
| 8 | Unit labeled and is easy to see. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *D* | *VENTILATION AND COMBUSTION AIR SUPPLY* | | | | |
| 1 | Sufficient fresh air supply for proper unit operation. | | | YES | NO |
| 2 | Fresh air not taken from areas that contain negative pressure producing devices. | | | YES | NO |
| 3 | Fresh air supply free of corrosive elements and flammable vapors. | | | YES | NO |
| 4 | Fresh air openings located correctly with consideration given to the blocking effect of louvers and grilles. | | | YES | NO |
| 5 | Overall ductwork length and restrictions comply with manufacturer requirements. | | | YES | NO |
| 6 | Ductwork is the same cross-sectional area as openings. | | | YES | NO |
| 7 | All ductwork is properly sealed and sloped per manufacturer specifications. | | | YES | NO |
| 8 | Vertical gas vents terminate with a listed cap or other roof assembly and are installed according to their manufacturer’s instructions. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *VENT PIPE SYSTEM* | | | | |
| 1 | Draft hood for atmospheric burners properly installed. | | | YES | NO |
| 2 | Vent connectors securely fastened with screws and supported properly to maintain 6-inch clearance. | | | YES | NO |
| 3 | Vent connector made of approved material and sloped correctly. | | | YES | NO |
| 4 | Vent pipe system in accordance with “National Fuel Gas Code”, NFPA 54, ANSI Z223.1-Latest Edition or prevailing provisions of local codes. | | | YES | NO |
| 5 | Overall ductwork length and restrictions comply with manufacturer requirements. | | | YES | NO |
| 6 | Flue baffle engaged in slots provided in the flue tube. | | | YES | NO |
| 7 | Flue way, draft hood or vent pipe system not obstructed in any way. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *F* | *WATER PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Piping is clean. | | | YES | NO |
| 5 | Unit connected to water supply and return/make-up piping using unions or flanges and isolation valves. | | | YES | NO |
| 6 | Dielectric fittings installed to isolate dissimilar pipe materials. | | | YES | NO |
| 7 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 8 | Thermometers and pressure gauges supplied on supply and return lines. | | | YES | NO |
| 9 | Piping insulation is complete and installed as per specifications. | | | YES | NO |
| 10 | All valves and test ports are easily accessible. | | | YES | NO |
| 11 | Valve tags attached. | | | YES | NO |
| 12 | Pressure and temperature relief valve(s) for correct pressure and temperature installed. | | | YES | NO |
| 13 | Pressure and temperature relief valve(s) piped with sufficient pipe diameter to drain designed for boiling water. | | | YES | NO |
| 14 | Drain valve installed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *G* | *GAS PIPING* | | | | |
| 1 | Gas supply is the same type as listed on the unit data plate. | | | YES | NO |
| 2 | Pressure reducing valves provide correct pressure to unit. | | | YES | NO |
| 3 | Gas cock / valve and union provided on gas supply. | | | YES | NO |
| 4 | Drip / dirt leg and cap provided on gas supply. | | | YES | NO |
| 5 | Pressure relief valves are piped to outdoors. | | | YES | NO |
| 6 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 7 | Gas utility company inspected installation (if required). | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *H* | *ELECTRICAL (if applicable)* | | | | |
| 1 | Local disconnect installed in accessible and visible location. | | | YES | NO |
| 2 | All electrical connections are tight. | | | YES | NO |
| 3 | All electrical components are grounded. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *I* | *MECHANICAL STARTUP* | | | | |
| 1 | System flushed, filled, and air purged. | | | YES | NO |
| 2 | Pilot lit according to manufacturer instructions. | | | YES | NO |
| 3 | Temperature setting adjusted to correct temperature per contract documents. | | | YES | NO |
| 4 | Pressure and temperature relief valve(s) set to proper pressure and temperature and manually checked for functionality. | | | YES | NO |
| 5 | Manufacturer's startup checklist completed and attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**CV-22 30 00 – Water Heaters (Steam)**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Maximum Steam Pressure (psig) | | |  |  |
| 5 | Maximum Steam Demand (lb/hr) | | |  |  |
| 6 | Maximum Flow Rate (gpm) | | |  |  |
| 7 | Recovery capacity at 100 deg. F rise (gph) | | |  |  |
| 8 | Storage Capacity (gal.) (if applicable) | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | Openings are sealed with plastic plugs. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Equipment location coordinated with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances. | | | YES | NO |
| 3 | Unit is set on concrete housekeeping pad and is level (commercial units ONLY). | | | YES | NO |
| 4 | Unit is installed on stand high enough for condensate to drain by gravity. | | | YES | NO |
| 5 | Adequate clearance around unit for service. | | | YES | NO |
| 6 | All components accessible for maintenance. | | | YES | NO |
| 7 | Proper clearances from combustible surfaces maintained per manufacturer’s instructions and applicable codes. | | | YES | NO |
| 8 | Unit labeled and is easy to see. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *D* | *WATER PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Piping is clean. | | | YES | NO |
| 5 | Unit connected to water supply and return/make-up piping using unions or flanges and isolation valves. | | | YES | NO |
| 6 | Dielectric fittings installed to isolate dis-similar pipe materials. | | | YES | NO |
| 7 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 8 | Thermometers and pressure gauges supplied on supply and return lines. | | | YES | NO |
| 9 | Piping insulation is complete and installed as per specifications. | | | YES | NO |
| 10 | All valves and test ports are easily accessible. | | | YES | NO |
| 11 | Valve tags attached. | | | YES | NO |
| 12 | Pressure and temperature relief valve(s) for correct pressure and temperature installed. | | | YES | NO |
| 13 | Pressure and temperature relief valve(s) piped with sufficient pipe diameter to drain designed for boiling water. | | | YES | NO |
| 14 | Drain valve installed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *STEAM PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Strainer and isolation valve installed. | | | YES | NO |
| 3 | Proper condensate trap installed. | | | YES | NO |
| 4 | Pressure relief valve installed prior to unit for steam supply pressures above maximum recommended pressure ratings for unit. | | | YES | NO |
| 5 | Safety and pressure relief devices installed in manner to minimize personnel and property damage. | | | YES | NO |
| 6 | Piping pitched for proper condensate flow by gravity. | | | YES | NO |
| 7 | Piping arranged for ease of unit removal. | | | YES | NO |
| 8 | Piping supported as required by specifications. | | | YES | NO |
| 9 | Piping is clean. | | | YES | NO |
| 10 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 11 | Pressure gauges supplied on supply lines. | | | YES | NO |
| 12 | Piping insulation is complete and installed as per specifications. | | | YES | NO |
| 13 | All valves and test ports are easily accessible. | | | YES | NO |
| 14 | Valve tags attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *F* | *MECHANICAL STARTUP* | | | | |
| 1 | System flushed, filled, and air purged. | | | YES | NO |
| 2 | Temperature setting adjusted to correct temperature per contract documents. | | | YES | NO |
| 3 | Pressure and temperature relief valve(s) set to proper pressure and temperature and manually checked for functionality. | | | YES | NO |
| 4 | Manufacturer's startup checklist completed and attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**CV-22 30 00 – Water Softeners**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Min. exchange capacity @ salt dosage (gr @ lb) | | | **@** | **@** |
| 5 | Max. exchange capacity @ salt dosage (gr @ lb) | | | **@** | **@** |
| 6 | Peak flow / pressure drop (gpm / psi) | | | **/** | **/** |
| 7 | Continuous flow / pressure drop (gpm / psi) | | | **/** | **/** |
| 8 | Inlet / outlet pipe sizes (in) | | | **/** | **/** |
| 9 | Voltage / Phase / Frequency (V / - /Hz) | | | **/ /** | **/ /** |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | Openings are sealed with plastic plugs. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup, operation and maintenance manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| 6 | Specified accessories provided | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Unit is set on concrete housekeeping pad and is level. | | | YES | NO |
| 3 | Equipment location coordinated with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances. | | | YES | NO |
| 4 | Adequate clearance around unit for service. | | | YES | NO |
| 5 | Minimum of 24” provided above brine tank. | | | YES | NO |
| 6 | All components accessible for maintenance. | | | YES | NO |
| 7 | Unit labeled and is easy to see. | | | YES | NO |
| 8 | Specified accessories installed and hardness test kit turned over to Owner. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *D* | *WATER PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Unit has been provided with bypass piping. | | | YES | NO |
| 4 | Piping supported as required by specifications. | | | YES | NO |
| 5 | Piping is clean. | | | YES | NO |
| 6 | Unit connected to water supply and return piping using unions or flanges and isolation valves. | | | YES | NO |
| 7 | Dielectric fittings installed to isolate dis-similar pipe materials. | | | YES | NO |
| 8 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 9 | Thermometers and pressure gauges supplied on supply and return lines. | | | YES | NO |
| 10 | Piping insulation is complete and installed as per specifications. | | | YES | NO |
| 11 | All valves and test ports are easily accessible. | | | YES | NO |
| 12 | Valve tags attached. | | | YES | NO |
| 13 | Drain valve installed and piped to nearest drain. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *ELECTRICAL* | | | | |
| 1 | Local disconnect or plug connection installed in accessible and visible location. | | | YES | NO |
| 2 | All electrical connections are tight. | | | YES | NO |
| 3 | All electrical components are grounded. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *F* | *MECHANICAL STARTUP* | | | | |
| 1 | Brine tank is filled with salt and correct level of water. | | | YES | NO |
| 2 | Local controller programmed and operational. | | | YES | NO |
| 3 | Media loaded per Manufacturer’s requirements | | | YES | NO |
| 4 | Manufacturer's startup checklist completed and attached. | | | YES | NO |
| 5 | Exchange rate, salt dosage, regeneration cycle times, consumption, backflow rate, brine flow rate, 12 hour standby tank cycle, variable reserve and proportional brining, etc. adjusted to contract document requirements. | | | YES | NO |
| 6 | Operation and maintenance training of Owner’s staff using O&M manual completed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Untreated Water** | **Treated Water** |
| *G* | *WATER TESTING* | | | | |
| 1 | Hardness (mg/l or grains/gal) | | |  |  |
| 2 | pH | | |  |  |
| 3 | Iron (mg/l and ppm) | | |  |  |
| 4 | Chlorine (ppm) | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Response** | |
| *H* | *EFFICIENCY CERTIFICATION* | | | | |
| 1 | Pre-Certified through Third Party testing | | | YES | NO |
| 2 | Certified by manufacturer’s engineering calculation approved w/ submittal | | | YES | NO |
| 3 | Certified by field sampling, meter analysis and adjustment | | | YES | NO |
| Field sampling and meter analysis data confirming efficiency | | |  | |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**CV-22 42 00 – Commercial Plumbing Fixtures**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**A) INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** | **9)** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Fixture traps and service stops easily accessible for service.
2. Fixture and carriers secured per manufacturer requirements and level and plumb to finished surface.
3. Pipe penetrations covered with escutcheons.
4. Openings between walls, floors and fixtures sealed with mildew-resistant silicone sealant same color as fixture.
5. Fixtures tested and fully operational.
6. Fixture valves adjusted for intended water flow rate to fixtures to eliminate splashing, noise or overflow
7. Self-closing lavatory faucets adjusted to 15 second cycle.
8. Shower valve temperature limit stops set to 110 degree maximum outlet temperature.
9. Fixtures and trim cleaned using manufacturer's recommended cleaning methods and materials.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**CV-22 42 00 – Electric Water Coolers**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Refrigerant Type | | |  |  |
| 5 | Flow (gph) | | |  |  |
| 6 | Voltage / Phase / Frequency (V / - / Hz) | | | **/ /** | **/ /** |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | The water openings are sealed with plastic plugs. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Adequate clearance around unit for service. | | | YES | NO |
| 3 | All components accessible for maintenance. | | | YES | NO |
| 4 | Unit installed at the proper height. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *D* | *WATER PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Unions provided at water connections to unit. | | | YES | NO |
| 4 | Piping supported as required by specifications. | | | YES | NO |
| 5 | Piping is clean. | | | YES | NO |
| 6 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 7 | All valves are easily accessible. | | | YES | NO |
| 8 | Valve tags attached. | | | YES | NO |
| 9 | Piping insulation is complete and installed as per specifications. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *ELECTRICAL* | | | | |
| 1 | Local disconnect installed in accessible and visible location. | | | YES | NO |
| 2 | All electrical connections are tight. | | | YES | NO |
| 3 | All electrical components are grounded. | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *F* | *MECHANICAL STARTUP* | | | | |
| 1 | Unit starts and runs without any unusual noise or vibration. | | | YES | NO |
| 2 | Stream and temperature adjustments made per manufacturer recommendations. | | | YES | NO |
| 3 | Unit interior and exterior clean and finish blemishes repaired. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**CV-22 50 00 – Pool, Aquarium, and Fountain Plumbing Systems**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**A) GENERAL PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** | **9)** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All piping, valves, etc. are clean and free of damage prior to installation.
2. Piping is free to expand and contract without noise or damage to hangers, joints, or the building.
3. Piping is installed with sufficient pitch and arranged in a manner to ensure drainage of entire system.
4. Changes in pipe sizes are made with the proper size reducing fittings, reducing elbow or reducing tees, and no bushings are utilized.
5. Pipe hanger spacing complies with specification requirements.
6. All equipment requiring maintenance is accessible (valves, strainers, etc.).
7. All valves are in an upright vertical position with handles in a horizontal position.
8. All valves can be fully operated without removal or alteration of handle, including provisions for specified insulation thickness of piping.
9. Isolation valves provided at all equipment connections, main branches and sub-branches, “T” connections, and as necessary for repairing the system as specified in contract documents.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**B) TESTING & FINALIZATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping tested utilizing water or air at specified pressure and duration as per specification for given piping system type.
2. All leaks identified during testing have been repaired and test re-done until satisfactory conditions are accomplished.
3. Test conducted with all piping of tested system or section visible during testing.
4. All exposed piping which passes through a wall, ceiling or floor is provided with escutcheon plates.
5. Piping labels and direction of flow is provided per specification requirements.
6. All penetrations through fire rated wall assemblies have been sealed per specification requirements.
7. All penetrations through non-rated wall assemblies have been sealed per specification requirements for given space type.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**CV-22 60 00 – Air Compressors**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Capacity (scfm @ psi) | | | **@** | **@** |
| 5 | Receiver capacity (gal) | | |  |  |
| 6 | Power / Speed (hp / rpm) | | |  |  |
| 7 | Voltage / Phase / Frequency (V / - / Hz) | | | **/ /** | **/ /** |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | The air openings are sealed with plastic plugs. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Unit is isolated from the building structure (to reduce vibration and noise) | | | YES | NO |
| 3 | Adequate clearance around unit for service. | | | YES | NO |
| 4 | All components accessible for maintenance. | | | YES | NO |
| 5 | Unit labeled and is easy to see. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *D* | *PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Piping is clean. | | | YES | NO |
| 5 | Pressure relief valve installed and is operational. | | | YES | NO |
| 6 | Automatic condensate drain piped to nearest floor drain. | | | YES | NO |
| 7 | Cartridge filter-silencer with pre and post isolation valves installed in piping for each compressor. | | | YES | NO |
| 8 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 9 | Valve tags attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *ELECTRICAL* | | | | |
| 1 | Local disconnect installed in accessible and visible location. | | | YES | NO |
| 2 | Motor rotation in the proper direction | | | YES | NO |
| 3 | All electrical connections are tight. | | | YES | NO |
| 4 | All electrical components are grounded. | | | YES | NO |
| 5 | Each motor terminal box is connected with a minimum 12", maximum 36" piece of flexible conduit to a fixed junction box. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *F* | *MECHANICAL STARTUP* | | | | |
| 1 | Belt sheaves have been properly aligned per the specifications. | | | YES | NO |
| 2 | Belt tension has been reviewed and adjusted after start-up of unit and again after 80 hours of operation. | | | YES | NO |
| 3 | Motor / compressor rotation is in the proper direction | | | YES | NO |
| 4 | System starts and runs free from unusual noise or vibration | | | YES | NO |
| 5 | Manufacturer's startup checklist completed and attached | | | YES | NO |
| 6 | Protective shrouds for belts in place and secure | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**CV-22 60 00 – Laboratory and Medical Gas and Vacuum Piping**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**A) PRE-INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All piping, valves, etc. are packaged and plugged, and free of damage prior to installation.
2. All installers are “Certified Installers” per manufacturer of piping systems.
3. Temporary end caps are provided on piping and fittings until installation.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**B) GENERAL PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping is free to expand and contract without noise or damage to hangers, joints, or the building.
2. Changes in pipe sizes are made with the proper size reducing fittings, reducing elbow or reducing tees, and no bushings are utilized.
3. Pipe hanger spacing complies with specification requirements for given type of piping.
4. All equipment requiring maintenance is accessible (valves, etc.).
5. Piping allows access to equipment that is part of this system or another system.
6. All pipe joints are silver brazed per specification.
7. Nitrogen purging was use continuously during the brazing process.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**C) NATURAL GAS AND LP PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** | **9)** | **10)** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping is not run through any plenums rated for ventilation.
2. 4" minimum depth dirt leg installed at the bottom of each vertical run and at each appliance.
3. All branch connections to the main branched from the top or side of the main.
4. If an above ground vent terminates in an area subject to snow accumulation, line terminated at least five feet above grade.
5. Each gas pressure reducing valve vent and relief valve vent run separately to a point outside of the building, terminated with a screened vent cap, and located according to gas utility regulations.
6. All welded piping cleaned before all regulators and control valves by placing target cloth over piping and blowing compressed air through line until cloth is clean and free of debris.
7. All valves are in an upright vertical position with handles in a horizontal position and fully operated without removal or alteration of handle.
8. Isolation valves provided at all equipment connections, main branches and sub-branches.
9. Open pipe ends capped at end of work day.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**D) NATURAL GAS AND LP TESTING & FINALIZATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping tested at specified pressure and duration as per specification.
2. All leaks identified during testing have been repaired and test re-done to meet specifications.
3. Entire testing procedure witnessed by DFD representative.
4. Test conducted with all piping of tested system or section visible during testing.
5. All exposed piping which passes through a wall, ceiling or floor is provided with escutcheon plates.
6. Piping labels and direction of flow is provided per specification requirements.
7. All penetrations through fire rated wall assemblies have been sealed per specification requirements.
8. All penetrations through non-rated wall assemblies have been sealed per specification requirements for given space type.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**C) COMPRESSED AIR AND VACUUM PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** | **9)** | **10)** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping and fittings have been joined per the specifications and or manufacturer installation instructions.
2. Air supply from compressor/pump assembly has been isolated from piping with wire braid reinforced rubber hose or polyethylene tubing.
3. Take-offs enter top of main air piping wherever possible.
4. All piping is supported per specification requirements and is not be attached to existing cabling, existing tubing, plumbing or steam piping, ductwork, ceiling supports or electrical or communications conduit.
5. All equipment requiring maintenance is accessible (valves, junction boxes, etc.).
6. All valves are in an upright vertical position with handles in a horizontal position and fully operated without removal or alteration of handle.
7. Isolation valves provided at all equipment connections, main branches and sub-branches.
8. Piping purged with nitrogen during brazing.
9. Piping purged with dry nitrogen prior to connection to inlets, outlets or gauges until no contamination evident on test cloth.
10. Open pipe ends capped at end of work day.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**D) COMPRESSED AIR AND VACUUM TESTING & FINALIZATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** | **9)** | **10)** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping preliminarily tested utilizing nitrogen at specified pressure and duration as per specification.
2. All leaks identified during preliminary testing have been repaired and test re-done until no leaks are present.
3. Piping tested utilizing nitrogen at specified pressure and duration as per specification.
4. Entire testing procedures have been witnessed by DSF representative.
5. Medical gas piping has been certified by NFPA authorized representative.
6. Test conducted with all piping of tested system or section visible during testing.
7. All exposed piping which passes through a wall, ceiling or floor is provided with escutcheon plates.
8. Piping labels and direction of flow is provided per specification requirements.
9. All penetrations through fire rated wall assemblies have been sealed per specification requirements.
10. All penetrations through non-rated wall assemblies have been sealed per specification requirements for given space type.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**CV-22 60 00 – Refrigerated Air Dryers**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Duty | | |  |  |
| 5 | Refrigerant Type | | |  |  |
| 6 | Capacity (scfm @ psi) | | |  |  |
| 7 | Power (hp) | | |  |  |
| 8 | Voltage / Phase / Frequency (V / - / Hz) | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | The air and water openings are sealed with plastic plugs. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Unit is isolated from the building structure (to reduce vibration and noise) | | | YES | NO |
| 3 | Adequate clearance around unit for service. | | | YES | NO |
| 4 | All components accessible for maintenance. | | | YES | NO |
| 5 | Unit labeled and is easy to see. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *D* | *PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Piping is clean. | | | YES | NO |
| 5 | Automatic drain piped to nearest floor drain. | | | YES | NO |
| 6 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 7 | Valve tags attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *ELECTRICAL* | | | | |
| 1 | Local disconnect installed in accessible and visible location. | | | YES | NO |
| 2 | All electrical connections are tight. | | | YES | NO |
| 3 | All electrical components are grounded. | | | YES | NO |
| 4 | Each motor terminal box is connected with a minimum 12", maximum 36" piece of flexible conduit to a fixed junction box. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *F* | *MECHANICAL STARTUP* | | | | |
| 1 | System starts and runs free from unusual noise or vibration | | | YES | NO |
| 2 | Manufacturer's startup checklist completed and attached | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**CV-22 60 00 – Vacuum Pumps**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group/Item** | **Group/Task Description** | | | **Submitted** | **Delivered** |
| *A* | *MODEL VERIFICATION* | | | | |
| 1 | Manufacturer | | |  |  |
| 2 | Model | | |  |  |
| 3 | Serial Number | | |  |  |
| 4 | Capacity (scfm @ psi) | | |  |  |
| 6 | Power / Speed (hp / rpm) | | |  |  |
| 7 | Voltage / Phase / Frequency (V / - / Hz) | | |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

| **Group/Item** | **Group/Task Description** | | | **Response** | |
| --- | --- | --- | --- | --- | --- |
| *B* | *PHYSICAL CHECKS* | | | | |
| 1 | Unit is free from physical damage. | | | YES | NO |
| 2 | The air openings are sealed with plastic plugs. | | | YES | NO |
| 3 | All components present. | | | YES | NO |
| 4 | Installation and startup manual provided. | | | YES | NO |
| 5 | Unit tags affixed. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *C* | *INSTALLATION* | | | | |
| 1 | Unit secured as required by manufacturer and specifications. | | | YES | NO |
| 2 | Unit is isolated from the building structure (to reduce vibration and noise) | | | YES | NO |
| 3 | Adequate clearance around unit for service. | | | YES | NO |
| 4 | All components accessible for maintenance. | | | YES | NO |
| 5 | Unit labeled and is easy to see. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *D* | *PIPING* | | | | |
| 1 | All piping components have been installed (in the correct order) as required by contract document or manufacturer. | | | YES | NO |
| 2 | Piping arranged for ease of unit removal. | | | YES | NO |
| 3 | Piping supported as required by specifications. | | | YES | NO |
| 4 | Piping is clean. | | | YES | NO |
| 5 | Exhaust piped to outside and clearly marked. | | | YES | NO |
| 6 | Piping and valves properly checked and free of leaks. | | | YES | NO |
| 7 | Valve tags attached. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *E* | *ELECTRICAL* | | | | |
| 1 | Local disconnect installed in accessible and visible location. | | | YES | NO |
| 2 | Motor rotation in the proper direction | | | YES | NO |
| 3 | All electrical connections are tight. | | | YES | NO |
| 4 | All electrical components are grounded. | | | YES | NO |
| 5 | Each motor terminal box is connected with a minimum 12", maximum 36" piece of flexible conduit to a fixed junction box. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |
| *F* | *MECHANICAL STARTUP* | | | | |
| 1 | Belt sheaves have been properly aligned per the specifications. | | | YES | NO |
| 2 | Belt tension has been reviewed and adjusted after start-up of unit and again after 80 hours of operation. | | | YES | NO |
| 3 | Motor / compressor rotation is in the proper direction. | | | YES | NO |
| 4 | System starts and runs free from unusual noise or vibration. | | | YES | NO |
| 5 | Manufacturer's startup checklist completed and attached. | | | YES | NO |
| 6 | Protective shrouds for belts in place and secure. | | | YES | NO |
| **❑ CHECKLIST GROUP COMPLETE** | | **INITIALS:** |  | **DATE:** |  |

**Negative Responses**

| **Group/**  **Item** | **Date**  **Found** | **Found**  **By** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |
|  |  |  |  | **YES / NO** |  |  |

**CV-22 67 00 – Processed Water Systems for Laboratories and Healthcare Facilities**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**A) PRE-INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All piping, valves, etc. are clean and free of damage prior to installation.
2. Temporary end caps are provided on piping and fittings until installation.
3. Piping is to be installed by trained installers per the manufacturer.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**B) GENERAL PIPING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** | **7)** | **8)** | **9)** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping is free to expand and contract without noise or damage to hangers, joints, or the building.
2. Piping is installed in a manner to ensure that insulation will not contact adjacent surfaces.
3. Piping is installed with sufficient pitch and arranged in a manner to ensure drainage of entire system.
4. Changes in pipe sizes are made with the proper size reducing fittings, reducing elbow or reducing tees, and no bushings are utilized.
5. Pipe hanger spacing complies with specification requirements.
6. All equipment requiring maintenance is accessible (valves, strainers, etc.).
7. Piping allows access to equipment that is part of this system or another system.
8. Water piping not installed within exterior walls.
9. Open pipe ends capped at completion of work day.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**C) VALVE & FITTING INSTALLATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All valves are in an upright vertical position with handles in a horizontal position.
2. All valves can be fully operated without removal or alteration of handle, including provisions for specified insulation thickness of piping.
3. Drainage valves provided at all low points and downstream of riser isolation valves.
4. Isolation valves provided at all equipment connections, main branches and sub-branches, “T” connections, and as necessary for repairing the system as specified in contract documents.
5. Riser shutoff valve and a capped hose thread drain valve at the bottom of each riser provided.
6. All strainers in piping system have ball valves installed at the tapped screen retainer.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**D) TESTING CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** | **5)** | **6)** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. Piping tested utilizing distilled water at specified pressure and duration as per specification.
2. All leaks identified during testing have been repaired and test re-done until no leaks are present.
3. Test conducted with all piping of tested system or section visible during testing.
4. Entire testing procedure witnessed by DFD representative.
5. After pressure testing system filled and disinfected with solution of distilled or RO water and hydrogen peroxide per manufacturer directions.
6. Following initial disinfection system flushed with distilled or RO water until no trace of hydrogen peroxide evident by potassium permanganate test.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

**E) FINALIZATION CHECKS**

| **Date** | **Description of Work Performed** | **%**  **Complete** | **Initials** | **Questions (See details below)** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1)** | **2)** | **3)** | **4)** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
|  |  |  |  | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** | **YES**  **NO** |  |  |  |  |  |  |
| **❑ CHECKLIST GROUP COMPLETE** | | | | **INITIALS:** | |  | | | **DATE:** | |  | | |

**Question Details**

1. All exposed piping which passes through a wall, ceiling or floor is provided with escutcheon plates.
2. Piping labels and direction of flow is provided per specification requirements.
3. All penetrations through fire rated wall assemblies have been sealed per specification requirements.
4. All penetrations through non-rated wall assemblies have been sealed per specification requirements for given space type.

**Negative Responses**

| **Group/Item** | **Date**  **Found** | **Found**  **By** | **Location** | **Reason for Negative Response** | **Resolved** | **Date**  **Resolved** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |
|  |  |  |  |  | **YES / NO** |  |  |

***Edit the individual functional performance test forms and provide additional test forms as needed to reflect the functional performance test requirements of assemblies, components, equipment and systems to be commissioned on this project. Include test forms with final review documents; no submission is required at preliminary review.***

***Edit to provide test forms unique to the specific test requirements of the project and remove the “SAMPLE” watermark. Edited or unedited test forms may be used in the bidding documents. Unedited test forms must be edited by the A/E at the time of shop drawing submittal and accompany the submittals when returned to the contractor prior to functional performance testing. Incorporate changes to the contract documents into the test forms prior to testing. This option is preferred for medium and large projects where there are many functional performance tests to be done.***

**FPT-22 30 00 – Domestic Water Booster Pump**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**Test Duration**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date: |  | Start Time: |  | End Time |  |
|  |  |  |  |  |  |
| Estimated Duration: | |  |  |  |  |
| Cx Provider(s): | |  | |  |  |
|  | |  | |  |  |
|  | |  | |  |  |
|  | |  | |  |  |
| Applicable Equipment: | |  | | | |
|  | |  | | | |

**Objectives**

This test is performed to investigate the functionality of domestic booster pumps.

**Instrumentation**

|  |  |  |
| --- | --- | --- |
| **Instrument** | **Accuracy** | **Measurement** |
| N/A | N/A | N/A |

**Stated Sequence**

*To be defined by A/E and commissioning provider at completion of construction documents.*

**Sampling Set**

All units and all sequences.

**Procedure**

1. Remote Start/Stop
   1. Verify pump is in occupied mode. If not override system into occupied mode.
   2. Override “on” command to “off”.
   3. Verify unit de-energizes.
   4. Return “on” command to normal operation.
   5. Verify unit is energized.
   6. Return system to normal operation.
2. Lead/Lag
   1. Verify pump is in occupied mode. If not override system into occupied mode.
   2. Verify that lead pump is energized and that unit controller and building automation system reflects pump and unit is operational.
   3. De-energize pump via local disconnect switch.
   4. Verify lag pump is energized and building automation system reflects status of each pump.
   5. Return system to normal operation.
   6. Repeat steps a-e for each lag pump.
3. Pressure Boost
   1. Verify pump is in occupied mode. If not override system into occupied mode.
   2. Record pressure setpoint of unit.
   3. Record current pressure of system.
   4. Adjust pressure setpoint to be 5 psig below current loop pressure.
   5. Verify pump(s) is energized and allow to stabilize for 10 minutes.
   6. Return system to normal operation.
   7. Verify pump(s) de-energizes.
4. Low Level Control (if applicable)
   1. Verify pump is in occupied mode. If not override system into occupied mode.
   2. Disconnect low level control electrodes to simulate a low level condition.
   3. Change run schedule for current time to be in down mode.
   4. Verify unit de-energizes.
   5. Return system to normal operation.
5. Alarms and Safeties
   1. Record low suction pressure setpoint.
   2. Record unit suction pressure.
   3. With unit ON in occupied mode, reset low suction pressure setpoint to be 2 psig above current unit suction pressure.
   4. Verify alarm is generated at local control panel and/or BAS head end.
   5. Return unit to normal operation.
   6. Record high suction pressure setpoint.
   7. Record unit suction pressure.
   8. With unit ON in occupied mode, reset high suction pressure setpoint to be 2 psig below current unit suction pressure.
   9. Verify alarm is generated at local control panel and/or BAS head end.
   10. Return unit to normal operation.
   11. Record low system pressure setpoint.
   12. Record system pressure.
   13. With unit ON in occupied mode, reset low system pressure setpoint to be 2 psig above current system pressure.
   14. Verify alarm is generated at local control panel and/or BAS head end.
   15. Return unit to normal operation.
   16. Record high system pressure setpoint.
   17. Record system pressure.
   18. With unit ON in occupied mode, reset high system pressure setpoint to be 2 psig below current system pressure.
   19. Verify alarm is generated at local control panel and/or BAS head end.
   20. Return unit to normal operation.

**Results**

**Remote Start/Stop:**

Unit is energized and de-energized when commanded by building automation system? YES NO

**Lead/Lag:**

Lag pump is energized on lead pump failure? YES NO

**Pressure Boost:**

|  |  |
| --- | --- |
| Pressure Setpoint: |  |
| Loop Pressure: |  |

Pump(s) is energized when loop pressure falls below pressure setpoint? YES NO

**Low Level Control:**

Unit is de-energized upon sense of low level condition? YES NO

**Alarms and Safeties:**

|  |  |
| --- | --- |
| Low Suction Pressure Setpoint: |  |
| Suction Pressure: |  |
| Alarm generated at local panel and BAS head end? | **Y / N** |
| High Suction Pressure Setpoint: |  |
| Suction Pressure: |  |
| Alarm generated at local panel and BAS head end? | **Y / N** |
| Low System Pressure Setpoint: |  |
| System Pressure: |  |
| Alarm generated at local panel and BAS head end? | **Y / N** |
| High System Pressure Setpoint: |  |
| System Pressure: |  |
| Alarm generated at local panel and BAS head end? | **Y / N** |

**Conclusion**

Acceptable Criteria: Unit is energized when called upon by BAS. Lag pump(s) is energized upon loss of power or failure of lead pump. Unit is energized on decrease in loop pressure below setpoint. Unit is de-energized on recognition of low level condition (if applicable). All alarm and safeties operate per specified sequence and initiate appropriate alarm conditions at local control panel and/or BAS head end

Comments:

Observations:

Final Status: ❑ Accepted ❑ Not Accepted

**Relevant Trend Data**

Unit status, pump(s) status, suction pressure, system pressure, tank level (if applicable).

**Witnesses**

| **Name** |  | **Signature** |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**FPT-22 30 00 – Inline Centrifugal Pump**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**Test Duration**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date: |  | Start Time: |  | End Time |  |
|  |  |  |  |  |  |
| Estimated Duration: | |  |  |  |  |
| Cx Provider(s): | |  | |  |  |
|  | |  | |  |  |
|  | |  | |  |  |
|  | |  | |  |  |
| Applicable Equipment: | |  | | | |
|  | |  | | | |

**Objectives**

This test is performed to investigate the functionality of inline centrifugal pumps.

**Instrumentation**

|  |  |  |
| --- | --- | --- |
| **Instrument** | **Accuracy** | **Measurement** |
| N/A | N/A | N/A |

**Stated Sequence**

*To be defined by A/E and commissioning provider at completion of construction documents.*

**Sampling Set**

All units and all sequences.

**Procedure**

1. Lead/Lag
   1. Have associated system and/or building automation system start and call for lead pump to run.
   2. Verify that lead pump is energized and that building automation system reflects unit is operational.
   3. De-energize pump via local disconnect switch.
   4. Verify lag pump is energized and building automation system reflects status of each unit.
   5. Return system to normal operation.
2. Aquastat
   1. Record temperature setpoint of aquastat.
   2. Record current temperature of water loop.
   3. Adjust aquastat setpoint to be 10º below current loop temperature.
   4. Verify pump is energized and allow to stabilize for 10 minutes.
   5. Return system to normal operation.
   6. Verify pump de-energizes.
3. Run Schedule
   1. Verify pump is in run mode. If not override system into run mode.
   2. Verify pump energizes.
   3. Change run schedule for current time to be in down mode.
   4. Verify pump de-energizes.
   5. Return schedule to originally programmed values.

**Results**

**Lead/Lag:**

Lead pump is energized when associated system commands? YES NO

Lag pump is energized on lead pump failure? YES NO

**Aquastat:**

|  |  |
| --- | --- |
| Aquastat Temperature Setpoint: |  |
| Water Temperature: |  |

Pump is energized when loop temperature falls below aquastat setpoint? YES NO

**Run Schedule:**

Pump is energized during scheduled run period? YES NO

Pump is de-energized during scheduled down period? YES NO

**Conclusion**

Acceptable Criteria: Pump is energized when called upon by its associated system, aquastat or timer, and that lag pump (if applicable) is energized upon loss of power or failure of lead pump.

Comments:

Observations:

Final Status: ❑ Accepted ❑ Not Accepted

**Relevant Trend Data**

Pump run status

**Witnesses**

| **Name** |  | **Signature** |
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**FPT-22 30 00 – Sewage Ejector Pumps**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**Test Duration**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date: |  | Start Time: |  | End Time |  |
|  |  |  |  |  |  |
| Estimated Duration: | |  |  |  |  |
| Cx Provider(s): | |  | |  |  |
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| Applicable Equipment: | |  | | | |
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**Objectives**

This test is performed to investigate the functionality of the sewage ejector pump.

**Instrumentation**

|  |  |  |
| --- | --- | --- |
| **Instrument** | **Accuracy** | **Measurement** |
| N/A | N/A | N/A |

**Stated Sequence**

*To be defined by A/E and commissioning provider at completion of construction documents.*

**Sampling Set**

All units and all sequences.

**Procedure**

1. Level Control / Off
   1. Verify all pumps are off.
   2. Open sump access door and visually verify that “off” level float is actuated.
   3. Fill sump until lead float is actuated.
   4. Verify lead pump is energized and record number of current lead pump.
   5. Allow pump to drain sump until “off” float is actuated.
   6. Verify pump de-energizes.
   7. (Continue with following steps only if multiple pumps are present in single sump) Disconnect lead pump via local disconnect.
   8. Fill sump until lead float is actuated.
   9. Verify lag pump is energized.
   10. Allow pump to drain sump until “off” float is actuated.
   11. Return lead pump to normal operation.
   12. Fill sump until lead float is actuated.
   13. With hook or other device raise lag or second stage float to actuate float.
   14. Verify both lead and lag pumps energize and drain sump until “off” level float is actuated.
   15. Repeat steps l-n for each additional level float present.
   16. Return system to normal operation.
2. Sump Cleaning
   1. Override system into sump cleaning mode.
   2. Fill sump until lead float is actuated.
   3. Visually verify draining of sump to “off” float actuation.
   4. Verify pump continues to operate past “off” float actuation.
   5. Verify pump is shut down once audible air entrainment is found.
   6. Return system to normal operation.
3. Alarms and Safeties
   1. With hook or other device lift high level float and verify high level

alarm is initiated at local control panel and/or BAS head end.

* 1. Release high level float and verify alarm is cleared.
  2. Locate moisture protection circuit at local control panel or BAS interface panel.
  3. Disconnect lead to panel for moisture to simulate a moisture condition in the pump motor.
  4. Verify alarm is generated at local control panel and/or BAS head end.
  5. Return unit to normal operation.
  6. Locate thermal protection circuit at local control panel or BAS interface panel.
  7. Disconnect lead to panel for moisture to simulate a moisture condition in the pump motor.
  8. Verify alarm is generated at local control panel and/or BAS head end.
  9. Return unit to normal operation.

**Results**

**Level Control/Off:**

|  |  |
| --- | --- |
| Single pump is activated with lead float actuation? | **Y / N** |
| Tag for initial pump activated |  |
| Single pump is de-energized at “off” float actuation? | **Y / N** |
| Lag pump is energized in second actuation of lead float? | **Y / N** |
| Lead and lag pumps are energized with actuation of lag float? | **Y / N** |
| Both pumps work in concert to drain sump until “off” float actuation? | **Y / N** |

**Sump Cleaning:**

Pump continues to operate past actuation of “off” float? YES NO

Pump is de-energized at first signs of audible air entrainment? YES NO

**Alarms and Safeties:**

Alarm generated at local panel and/or BAS head end on activation of high level alarm float? YES NO

High level alarm is cleared once high level float is released? YES NO

Alarm generated at local panel and/or BAS head end on activation of motor moisture protection alarm? YES NO

Alarm generated at local panel and/or BAS head end on activation of motor thermal protection alarm? YES NO

**Conclusion**

Acceptable Criteria: Pump level controls operate per stated sequence. Sump cleaning sequence operates per stated sequence. All alarm and safeties operate per specified sequence and initiate appropriate alarm conditions at local control panel and/or BAS head end

Comments:

Observations:

Final Status: ❑ Accepted ❑ Not Accepted

**Relevant Trend Data**

Pump run status

**Witnesses**

| **Name** |  | **Signature** |
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**FPT-22 30 00 – Sump Pumps**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**Test Duration**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date: |  | Start Time: |  | End Time |  |
|  |  |  |  |  |  |
| Estimated Duration: | |  |  |  |  |
| Cx Provider(s): | |  | |  |  |
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| Applicable Equipment: | |  | | | |
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**Objectives**

This test is performed to investigate the functionality of the sump pump.

**Instrumentation**

|  |  |  |
| --- | --- | --- |
| **Instrument** | **Accuracy** | **Measurement** |
| N/A | N/A | N/A |

**Stated Sequence**

*To be defined by A/E and commissioning provider at completion of construction documents.*

**Sampling Set**

All units and all sequences.

**Procedure**

1. Level Control / Off
   1. Verify all pumps are off.
   2. Open sump access door and visually verify that “off” level float is actuated.
   3. Fill sump until lead float is actuated.
   4. Verify lead pump is energized and record number of current lead pump.
   5. Allow pump to drain sump until “off” float is actuated.
   6. Verify pump de-energizes.
   7. (Continue with following steps only if multiple pumps are present in single sump) Disconnect lead pump via local disconnect.
   8. Fill sump until lead float is actuated.
   9. Verify lag pump is energized.
   10. Allow pump to drain sump until “off” float is actuated.
   11. Return lead pump to normal operation.
   12. Fill sump until lead float is actuated.
   13. With hook or other device raise lag or second stage float to actuate float.
   14. Verify both lead and lag pumps energize and drain sump until “off” level float is actuated.
   15. Repeat steps l-n for each additional level float present.
   16. Return system to normal operation.
2. Alarms and Safeties
   1. With hook or other device lift high level float and verify high level alarm is initiated at local control panel and/or BAS head end.
   2. Release high level float and verify alarm is cleared.
   3. Locate moisture protection circuit at local control panel or BAS interface panel.
   4. Disconnect lead to panel for moisture to simulate a moisture condition in the pump motor.
   5. Verify alarm is generated at local control panel and/or BAS head end.
   6. Return unit to normal operation.
   7. Locate thermal protection circuit at local control panel or BAS interface panel.
   8. Disconnect lead to panel for moisture to simulate a moisture condition in the pump motor.
   9. Verify alarm is generated at local control panel and/or BAS head end.
   10. Return unit to normal operation.

**Results**

**Level Control/Off:**

|  |  |
| --- | --- |
| Single pump is activated with lead float actuation? | **Y / N** |
| Tag for initial pump activated |  |
| Single pump is de-energized at “off” float actuation? | **Y / N** |
| Lag pump is energized in second actuation of lead float? | **Y / N** |
| Lead and lag pumps are energized with actuation of lag float? | **Y / N** |
| Both pumps work in concert to drain sump until “off” float actuation? | **Y / N** |

**Alarms and Safeties:**

Alarm generated at local panel and/or BAS head end on activation of high level alarm float? YES NO

High level alarm is cleared once high level float is released? YES NO

Alarm generated at local panel and/or BAS head end on activation of motor moisture protection alarm? YES NO

Alarm generated at local panel and/or BAS head end on activation of motor thermal protection alarm? YES NO

**Conclusion**

Acceptable Criteria: Pump level controls operate per stated sequence. All alarm and safeties operate per specified sequence and initiate appropriate alarm conditions at local control panel and/or BAS head end

Comments:

Observations:

Final Status: ❑ Accepted ❑ Not Accepted

**Relevant Trend Data**

Pump run status

**Witnesses**

| **Name** |  | **Signature** |
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**FPT-22 30 00 – Water Heater**

**Equipment Identification/Tag: \_\_\_\_\_\_\_**

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

**Test Duration**

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| --- | --- | --- | --- | --- | --- |
| Date: |  | Start Time: |  | End Time |  |
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| Estimated Duration: | |  |  |  |  |
| Cx Provider(s): | |  | |  |  |
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| Applicable Equipment: | |  | | | |
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**Objectives**

This test is performed to investigate the ability of the water heater to provide hot water to the facility.

**Instrumentation**

|  |  |  |
| --- | --- | --- |
| **Instrument** | **Accuracy** | **Measurement** |
| N/A | N/A | N/A |

**Stated Sequence**

*To be defined by A/E and commissioning provider at completion of construction documents.*

**Sampling Set**

All units and all sequences.

**Procedure**

1. Record hot water temperature set point and verify complies with contract documents.
2. Open a single faucet fed by water heater so as to cause water to flow through the hot water supply lines.
3. Record temperature of water exiting water heater.
4. Allow unit to cycle on and off a total of three times.
5. Record temperature of water exiting water heater.
6. Verify no discernable difference between initial and final water temperatures is present.
7. Increase water temperature setpoint by 10°F.
8. Allow unit to cycle on and off a total of three times.
9. Open a single faucet fed by water heater so as to cause water to flow through the hot water supply lines.
10. Record temperature of water exiting water heater and verify temperature is within ±2.0oF.
11. Return system to normal operating temperatures

**Results**

|  |  |
| --- | --- |
| Initial temperature set point: |  |
| Temperature setpoint complies with contract documents? | **Y / N** |
| Exiting water temperature #1: |  |
| Exiting water temperature #2: |  |
| No discernable difference in exiting water temperatures (±1.0oF) from unit heater under normal operating conditions for single faucet? | **Y / N** |
| Raised temperature set point: |  |
| Exiting water temperature #3: |  |
| Exiting water temperature is within ±2.0oF of raised temperature setpoint? | **Y / N** |

**Conclusion**

Acceptable Criteria: Initial hot water temperature setpoint complies with contract documents. No discernable temperature difference of exiting water temperatures observed under normal operating conditions for single faucet. Difference between temperature setting of the water heater and the temperature read by the test instrument is ±2.0oF with raised temperature setpoint.

Comments:

Observations:

Final Status: ❑ Accepted ❑ Not Accepted

**Relevant Trend Data**

N/A

**Witnesses**

| **Name** |  | **Signature** |
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