1 Purpose

1.1 Provide a standard procedure for start-up and commissioning of HVAC equipment.

1.2 Provide a standard procedure for coordinating selection, receiving, check out, and acceptance of new equipment.

2 Scope

2.1 This procedure applies to (but is not limited to) the following types of equipment: Air Compressors and Air Dryers.

3 Responsibility

3.1 Project Managers have overall responsibility for new equipment from procurement to start-up. To assure optimum selection of equipment and smooth commissioning, the Project Manager is responsible for coordinating the following activities:

3.1.1 Review of customer and specific job specifications.

3.1.2 Review of equipment selected with Service prior to ordering. Assure equipment is on approved list.

3.1.3 Review drawings, assure drawing schedules and equipment details are correct.

3.1.4 Coordinate delivery and commission schedule with all team members including (but not limited to): Site Foremen, Balance and Service (start-up), Customer, General Contractor, and Safety (as needed).

3.1.4.1 In most cases, Start-up should be scheduled a month in advance.

3.1.4.2 If exact date is known, Service should be notified with estimated time frame.

3.1.4.3 Communicate specific requirements to all team players in writing and verbally.

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3.1.4.4 Provide appropriate job number to team members.

3.2 Therma Service/Start-up has responsibility for the following activities:

3.2.1 Therma will provide a qualified service mechanic to perform equipment start-up.

3.2.2 The start-up technician will perform the start-up tasks as specified in the commissioning Standard Operating Procedure for that equipment.

3.2.3 Service will provide estimated time required to Project Manager (PM) prior to start-up. Service will meet agreed upon schedules to assure customer satisfaction.

3.2.4 The start-up technician will fully complete a start-up sheet for each piece of equipment. A copy of this sheet will be provided to the Project Manager with the turnover documents: A second copy will be filed in Service by customer name and address.

3.2.5 All time will be charged to the appropriate job number as specified by the Project Manager. If requested, Time and Material sheet shall be completed.

3.3 The Start-up/Commissioning Coordinator has responsibility for the following activities:

3.3.1 Provide a communication path between the Project Manager and the Field Foremen.

3.3.2 Schedule qualified personnel for start-up, balance, test, and room certification as required.

3.3.3 Coordinate punchlist completion with Project Managers.

3.3.4 Coordinate start-up, service, balance, and testing report documentation.

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4 Procedures

4.1 General: Service Technician is responsible for filling out start-up sheet title FN 8.038.1 for Air Compressors. A start-up sheet will be completed for each piece of equipment. Each sheet requires the following information:

4.1.1 Job identification: The job name, job number, and job address are to be completed by the start-up/commissioning coordination. These will be provided to the Service Technician.

4.1.2 Section 5 - Equipment Description.

4.1.3 Section 6 - Equipment Pre-Installation Inspection.

4.1.4 Section 7 - Equipment Installation Inspection.

4.1.5 Section 8 - Operational Inspection.

4.1.6 Signature - As each section and page is completed, the service technician must print and sign his/her name and record the date. This document should also be signed off by an owner representative.

5 Equipment Description

5.1 This section should be completed by the Service Technician or service coordinator. Any design documentation specifying equipment should be recorded in this section. This includes: Specification number, Submittal number, Process and Instrumentation Diagram number, and Drawing number. Also, record which area this equipment will be serving.

5.2 In the “design” column, record the following information as specified on the design documents. Unit Tag number (per drawings) Manufacturer (per equipment schedule and/or approved submittals) Model number (per equipment schedule and approved submittals)

5.3 Fill in filter and belt information.

6 Equipment Pre-Installation Inspection

6.1 For each of the following items: Check Yes, No or N/A for not applicable. If No is checked, describe the difference in the comment section and notify the Project Manager immediately. Initial and date each item as it is checked.

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6.2 Nameplate data matches vendor specifications. When the equipment is delivered, verify it matches specifications. Complete Section 5. In the “actual on site” column, record the actual data as shown on the equipment and verify that it matches design criteria.

6.3 All parts are received and verify the packing slip(s). Note any discrepancies and notify the Project Manager.

6.4 No visible signs of damage, leak, or defective parts.

6.5 Verify electrical service for correct voltage, current and thermal overload protection.

6.6 Operation and Maintenance (O&M) manual is available in the field.

6.7 Start up technicians reviewed factory start up procedures in the Operation and Maintenance manual.

7 Installation Inspection

7.1 For each of the following items: Check Yes, No or N/A for not applicable. If No is checked, describe the difference in the comment section. LockOut/Tag Out procedure should be observed before most of the following steps. If there are any discrepancies, notify the Project Manager immediately.

7.2 Unit is installed level and is covered or out of weather. Check Operation and Maintenance literature some equipment needs to be level to $^{1}/8$” or better to allow proper drainage and or operation. Examples horizontally mounted only indoor operation only etc.

7.3 Tag number is attached to the unit. Tag should be attached to service disconnect or near unit identification plate, if mounted in a ceiling system tagging should reflect location above or below.

7.4 Service clearance is adequate for maintenance. Service clearance includes access to the equipment through the ceiling systems, over duct work etc. filter access for removal and replacement are essential.

7.5 Compressor pump is lubricated. Check Operation and Maintenance literature.

7.6 Drive belt tension is correct. Adjust belt tension for optimum performance incorrect belt tension causes wear and vibration and excess particles.

7.7 Pulleys are aligned and tight. Use string or straight edge method.

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7.8 Air inlet, oil filters, and discharge filters are installed properly. Check Operation and Maintenance literature.

7.9 Compressor oil level is within manufacturer's specifications. Check Operation and Maintenance literature.

7.10 Guard is secure. Check Operation and Maintenance literature.

7.11 Auto drains are installed on tank and run to sanitary or condensate separator. Check Operation and Maintenance literature.

7.12 All wiring connections are tight. Check all terminals, with a reliable meter, from line to line and to ground before checking all electrical connections in all panels, motors, and devices. Check wire, wire nuts, spade connectors, and crimps as well.

7.13 Drain is piped properly. Check Operation and Maintenance literature: generally oil free air compressor drains are piped to sanitary drainage system of building (not storm) drain.

7.14 Air dryer is installed.

7.15 Oil separator is installed. Check Operation and Maintenance literature: generally an oil separator is required if oil carry over will be in the drain from an air compressor.

7.16 Oil separator drain is run to sanitary drain. (Not storm)

7.17 Condensate management system is installed for oil separation. Check Operation and Maintenance literature.

8 Operational Inspection

8.1 If there are any discrepancies, notify the Project Manager immediately. Use Operation and Maintenance literature and follow start up procedures the form FN 8.038.1 is a general out line and is to provide a quality assured start up when used in conjunction with the Operation and Maintenance literature.

8.2 Unit vibration is acceptable. Check Operation and Maintenance literature for tolerances. Check for vibration at different fan speeds and volumes. Check unit, check around unit and below roof under unit.

8.3 Motor rotation is correct. Check Operation and Maintenance literature.

8.4 Air dryer is functional Check Operation and Maintenance literature.

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8.5 Oil separator is functional. Check Operation and Maintenance literature.

8.6 Record start-up operating parameters.

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Document Approval

Service Manager — Date: 5-18-99

Service Supervisor — Date: 5/19/99

Quality Assurance Manager — Date: 5-28-99

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