

Standard Operating Procedure Start-Up Procedure & Verification for Fans	SOP No. 8.032
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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: Exhaust Fans, Booster Fans, Independent Scrubber Exhaust Fans, Air Shower Fans, Transfer Fans, Ventilation Fans, or any other single fan non filtered fan assembly.

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 customer and specific job specifications.
 - 3.1.2 Review equipment selected with Service prior to ordering.
 - 3.1.3 Assure equipment is on approved list.
 - 3.1.4 Review drawings, assure drawing schedules and equipment details are correct.
 - 3.1.5 Coordinate delivery and commissions schedule with all team members including (but not limited to): Site Foremen, Balance and Service (start-up), Customer, General Contractor, and Safety (as needed).
 - 3.1.5.1 In most cases, Start-up should be scheduled a month in advance.
 - 3.1.5.2 If exact date is known, Service should be notified with estimated time frame.

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

3.1.5.4 Provide appropriate job number(s) 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(s) as specified by the Project Manager. If requested, Time and Material sheets 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 FN 8.032.1 for Fans. 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, Drawing number. Also, record which area this equipment will be serving.

5.2 Fill 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 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 the design criteria.
 - 6.3 All parts are received and verify the packing slip(s).
 - 6.4 Inspect for visible signs of damage, leak, or defective parts. Note any discrepancies and notify the Project Manager.
 - 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.
 - 6.8 If Therma provided Variable Frequency Drives (VFDs) that are controlling the fans, complete FN 8029.1 VFD start-up form.
- 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 and notify the Project Manager immediately. Lock Out/Tag Out procedures should be observed before most of the following steps.
 - 7.2 Unit is installed level. Check Operation and Maintenance literature: some equipment needs to be level to 1/8” or better to allow proper drainage and or operation.
 - 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 All access panels and covers are in place. Including: electrical, fan, filter, damper, return air, economizer section, supply air doors and covers.

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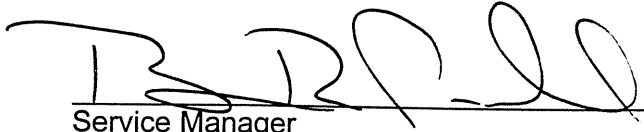
- 7.6 Vibration isolators are installed and adjusted. Check Operation and Maintenance literature: internal and external isolation skids and springs need to be set properly. Isolators equipped with rubber damper washers on the seismic restraints these must be “just free” not compressed or removed. Isolation springs must not be used as leveling devices: leveling should be accomplished otherwise.
 - 7.7 Ductwork and flex connections are connected and sealed.
 - 7.8 Each fan drive belt tension is correct. Adjust belt tension for optimum performance. Incorrect belt tension causes wear vibration and excess particles.
 - 7.9 Sheaves are aligned. Use string or straight edge method.
 - 7.10 Fan hub, sheaves, and bearing sets screws are tight. Check Operation and Maintenance literature: lubricate accordingly prior to use.
 - 7.11 Motor and blower bearings are lubricated. Check Operation and Maintenance literature: lubricate accordingly prior to use.
 - 7.12 Electrical connections are secure. 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 nuts, spade connectors, and crimps as well.
 - 7.13 Fan shaft bearings angular alignment is correct and bolts are tight. Fan shaft is in 90° alignment with shaft bearings.
 - 7.14 Auxiliary drain pan is installed and its connections are piped. If auxiliary pan is provided, overflow piping should be routed to a obvious place to drain as a warning.
- 8 Operational Inspection
- 8.1 Use Operation and Maintenance literature and follow start up procedures the form FN 8.032.1 is a general out line and is to provide a quality assured start up when used in conjunction with the Operation and Maintenance literature. If there are any discrepancies notify the Project Manager immediately.
 - 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 Each fan rotation is correct.

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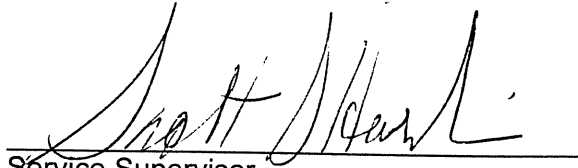
- 8.4 Supply, return or exhaust air dampers are functional. Operate (or have operated) control dampers, check for opened full closing, check if dampers modulate all with out binding.
- 8.5 Fire dampers are functional and open.
- 8.6 Supply, return and outside air dampers are functional. Operate (or have operated) control dampers, check for full opening, full closing, check if dampers modulate with out binding.
- 8.7 Smoke detector is tested and is able to shut the unit down. This may or may not be in Therma scope, either way, insure unit shuts down per exact specifications.
- 8.8 Make sure thermostat is set. Operate (or have operated) temperature controls to ensure all functions and set points.
- 8.9 Make sure time clock is set. Set time, set date, check shut down, through time clock.
- 8.10 Record start up operating parameters in the Supplementary forms, FN 8.028.2 and FN 8.028. Use as many of the Supplementary forms as necessary to complete Air Handler start-up form FN 8.028.1.

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Document Approval


Service Manager

5-18-99
Date


Service Supervisor

5/19/99
Date


Quality Assurance Manager

5-28-99
Date

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