CENTRAL, SPLIT SYSTEM REFRIGERATED AIR-CONDITIONING INSPECTION

Perform the inspection and operation of the air-conditioning system and its related components before operating the heating system.

INTERIOR

Thermostat(s)

- **Location**
- **Settings**
- **Damaged**
- **Secured**
- **Missing**
- **Operational**
- **Blower speed settings**

Furnace / Air Handler

If the air handler is part of a furnace, you may choose to inspect the physical condition of the furnace and its related components at the same time.

- **Electrical service disconnection means (type, damaged, secured, missing, operational)**
- **Blower (type, operable, damaged, secured, dirty motor, dirty vanes, noisy)**
- **Blower wiring (damaged, loose, improper connections)**
- **Blower compartment (dirty)**
- **Blower compartment door (damaged, secured, missing)**
- **Belt (damaged, loose, missing)**
- **Low voltage control wiring (damaged, secured, protected)**

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Condensate Collection and Discharge Components

- **Type (single pan, double pan, pumped)**
- **Primary collection pan (damaged, obstructed outlet)**
- **Secondary collection pan (damaged, secured, missing, sloped toward drain outlet, evidence of water in pan, debris in pan)**
- **Drain lines (damaged, secured, protected, missing, trapped, vented, obstructed, proper discharge termination location[s])**

Refrigerant Lines and Fittings

- **Damaged/oily**
- **Secured/supported**
- **Insulation on suction line (damaged, missing)**
- **Excess line properly coiled**

Conditioned Air Distribution System

- **Plenums (damaged, secured, sealed, vibration collars, dampers)**
- **Duct work (type, damaged, secured, sealed, missing, supported, installation, debris, cleaned, fans dampers)**
- **Humidifier (type, location, damaged, secured, leaking, dirty, installation, damper, wiring, proper drain and drain line)**
- **If there is access through the supply plenum or other areas which will allow inspection of all or part of the inside coil (air-conditioning evaporator coil), then inspect the coil and primary condensate collection pan for damage, obstruction, and oil. For example, such access may be through a removable panel or through an opening provided for a central humidifier.**
- **Supply registers (location, damaged, secured, missing, dirty, operational)**
- **Return grilles (location, number, damaged, secured, missing, dirty, functional)**

Filter(s)

- **Type**
- **Location**
- **Dirty**
- **Damaged**
- **Missing**
- **Improperly sized**
- **Improperly installed / secured**
- **Wiring (if electronic)**

EXTERIOR

Compressor / Outside Coil

- **Dead case (once this is confirmed, turn off the power supply at the service disconnection device)**
- **Location (sun, exhaust vents, bedroom windows, roof runoff)**
- **Mounting / placement of pad or base (damaged, missing, secured, out of level, improper materials)**
- **Case (damaged, secured, missing components)**
- **Debris / oil inside of case**
- **Air flow (obstructed)**
- **Outside coil fins (damaged, dirty/obstructed)**
- **Outside coil fan (damaged, secured, seized, missing/damaged protective grille)**
- **Refrigerant lines (damaged, damaged suction line insulation, oily, protected, opening through house wall sized and protected)**
- **Filter / drier (location, direction, damaged)**
- **Sight glass (damaged, visible bubbles [indicate low refrigerant], color ring color change [indicates water in the refrigerant])**

Electrical Power

- **Disconnection means (location, type, cover locked/secured, damaged, secured, missing components, damaged / improper fuses, breakers, or pull out, damaged/improper wiring)**

- **Conduit and fittings (type, damaged, secured, missing)**

- **Low voltage control wiring (damaged, secured, protected)**

Data Plate

- **Model (not required)**
- **Serial number (not required)**
- **Age (not required)**
- **Tonnage (not required)**
- **Electrical information (necessary to determine correct conductor size and overcurrent protection device type and size)**

When a filter/drier is installed on the suction line close to the compressor/condenser unit, it usually indicates that the original compressor has been replaced. The filter/drier has been installed to trap particulates created when the old compressor overheated or burned out. Without the filter/drier, particulates and varnish can clog the metering device. If the system utilizes capillary tubes, they cannot be removed and replaced independent of the evaporator coil. After a few days or weeks of operation, the suction line filter/drier that was installed when the new compressor was installed should be removed and replaced to prevent restriction in the suction line and back pressure in the system due to a clogged filter.

OPERATION OF THE SYSTEM

Before operating the air-conditioning system, confirm that the electrical power to the unit has been on for at least twenty-four (24) hours and that the outside temperature has been 65° F or higher for at least twelve (12) hours before operating the unit. <u>If these time and outside temperature criteria have not been met, do not operate the air-conditioning system.</u> Under such circumstances the written inspection report must state that the system was not operated and why. It must also include information stating that, because the system could not be operated, the ability of the system to perform its normally intended function and operation could not be determined.

If, before operating the system or while the system is operating, you determine that there are other conditions which may damage system components if the system is operated or continues to operate, then do not

operate it or, if it is operating, shut it off. Your written report must clearly describe any such conditions along with your reasons for not operating or for shutting down the system and direct appropriate actions to address the conditions.

Operate the thermostat after carefully noting all of its settings prior to operation and confirm that the blower is running.

Wait until the system has been in operation for a minimum of fifteen minutes before taking a temperature split reading across the evaporator coil.

Go to the exterior compressor / condenser unit. Is it operating? Is it atypically noisy or vibrating? Is it smoking or is there a distinct odor that is consistent with overheated electrical components? If it is seized, atypically noisy, clearly out of balance, smoking, or you detect an odor that is consistent with overheated components, shut the unit off immediately at the service disconnection device. The operational portion of the system inspection is concluded. Inform your customer and be sure to document the condition(s) and recommended appropriate action in the report.*

If the system is operational, inspect the compressor/condenser unit, refrigerant lines, and control wiring. Then, return to the interior of the house and confirm that air is being discharged from each accessible supply register and that air is being drawn through each accessible return grille.

Next, inspect the air handler while the system is operating. Is the blower operational? Is it atypically noisy? Is there an odor consistent with overheated components? Examine the refrigerant lines for oil. If the system has been operating for at least fifteen minutes, you can measure the temperature split (Δt) across the evaporator coil. Some inspectors will perform this procedure using dial thermometers inserted into the air stream in the supply plenum immediately downstream of the coil and in the return plenum immediately upstream of the coil. Others prefer to use an electronic infrared thermometer to obtain the temperature split readings at a supply register and at a return grille. Regardless of the method used, it is important to be familiar with the proper use of and limitations of the instruments employed to determine the Δ t.

A Δt in the range of 14±° F to 20±° F is considered to indicate that the system is performing properly.

A Δt below the lower limit of this range may be the result of a low refrigerant charge, a dirty or obstructed filter, a dirty, iced, or obstructed evaporator coil, a dirty or obstructed condenser coil, an undersized compressor, an undersized evaporator coil, an obstructed expansion device, blower speed is too low, duct system is not properly sized, an air distribution system damper is in the wrong position, or other conditions.

*See page 7 “Using a Clamp-on Ammeter to Measure the Current Draw of an Air-Conditioning Compressor”

A Δt above the upper limit of this range may be a result of insufficient air flow across the evaporator coil due to heavy icing of the coil.

Go back to the exterior unit and to determine if the suction line is sweating and cold to the touch and if the liquid line is warm to the touch. Frost or ice on the suction line indicates a problem and may be due to an air handler blower speed problem, a dirty filter, an obstructed evaporator coil, a defective metering device, low refrigerant charge, or other conditions.

If a sight glass is installed in the liquid line, observe it to determine whether there are bubbles in the refrigerant. Bubbles indicate a low refrigerant charge. Some sight glasses are fitted with a colored ring around the circumference under the glass. If the ring has changed color from the indicated original color, this is consistent with the presence of water in the refrigerant. Water in the refrigerant will damage the compressor.

Feel the air being discharged from the unit on the downstream side of the air flow to determine if it is warmer than the ambient air.

After the system has been running for between fifteen minutes and thirty minutes, observe area beneath the supply plenum and the secondary condensate collection pan (where applicable) for moisture. Observe the discharge outlet(s) of the condensate drain line(s) for condensate discharge. Observe any condensate collection and discharge pump equipment for proper operation.

When you have completed your inspection of the air-conditioning system, proceed with your inspection of the heating system.

After you have completed your inspections of both the cooling and heating systems, reset all thermostats to their original settings.

Using a Clamp-on Ammeter to Measure Current Draw on an Air-Conditioner Compressor

The following information pertains to a procedure which exceeds the Standards and is not required as part of the inspection of an air-conditioning system in accordance with the Standards. Further, because performing an evaluation of the compressor using a clamp-on ammeter requires the insertion of a testing device into an area of the system where live 240 volt (nominal) components are present, **it is not only not recommended by *ProSpex*, *ProSpex* very strongly discourages the performance of such an evaluation and procedure!**

This procedure involves inserting a clamp-on ammeter into an electrical distribution panel or service disconnection device box to determine the actual operating amperage of the compressor. This amperage can then be compared to the RLA (Rated Load Amperage) listed on the data plate of compressor/condenser unit.

When a compressor is operating properly, the measured operating amperage should be approximately eighty (80) percent of the data plate. It can be somewhat higher on a very hot day and somewhat lower on a cool day.

An operating amperage which is equal to or above the data plate RLA is consistent with a worn or damaged compressor that is approaching the end of its serviceable life.

To perform this procedure, the ammeter must be clamped on or around either of the 120 volt (nominal) conductors in the distribution panel or in the service disconnection device box supplying 240 volt (nominal) power to the compressor.

The condenser fan current on listed the data plate must be subtracted from the current measured with the ammeter to obtain an accurate operational compressor amperage reading. Extreme caution must be exercised when performing this procedure as it requires working in close proximity to exposed energized electrical components.