

2005 City of Lodi Electric Utility High Efficiency & Duct Repair Rebate Program Protocols

Background

- ❖ The City of Lodi Electric Utility has contracted with the Energy Doctor, Inc. to implement the 'House- As-a-System Home Inspection Program,' utilizing state of the art diagnostic technologies, such as Minneapolis Blower Door, and Honeywell Enalaysys eScanAF™ equipment. The purpose of this inspection is to:
 - 1) identify, educate and direct City of Lodi Electric Utility customers on cost-effective energy saving home improvement opportunities based on the existing condition of their home;
 - 2) improve the overall performance of the central heating & air conditioning system.
- ❖ The Honeywell Enalaysys eScanAF™ technology has been selected for this pilot program because of its advanced technology and its ability to diagnose hidden problems with the HVAC systems.

Eligibility

- ❖ *Qualified Homes*
 - 1) homes that are 10 years or less in age, are **not eligible** for the eScanAF™ airflow portion of the City of Lodi Electric Utility 'House-As-a-System Home Inspection Program,' and therefore not eligible for duct replacement rebates. These newer homes will be tested using the Duct Blaster, measuring tight ducts, and not the air flow, as the inspection program is focused on repairing older housing stock;
 - 2) duct systems that are 10 to 15 years in age, are **not eligible** for the duct replacement rebates as the ductwork is considered to be in useable condition, *unless*:
 - your load calculation and duct design proves the existing ductwork to be inadequate;
 - you advise the City of Lodi Electric Utility and obtain prior authorization to replace the delivery system;
 - 3) duct systems over 15 years in age **are eligible** for the duct replacement rebates;
 - 4) all homes **are eligible** for the duct repair rebates, unless-
 - the home was built using tight duct methods for energy compliance;
 - the home owner has already received funding under a previous City of Lodi Electric Utility rebate program for duct repair;
 - 5) in order to qualify for the duct replacement rebate, 100% of the accessible ductwork (supply and return) must be replaced (with a reasonable improvement in air flow);
 - 6) in order to qualify for a tight duct rebate the pre CFM25 must be greater than 151 CFM and the post CFM25 must be at or below 150 CFM25 using Minneapolis Duct Blaster with a reasonable reduction in CFM air loss;
 - 7) duct systems over 10 years in age must meet the proper system air flow @ 400 CFM per ton + or - 15% using eScanAF™ when qualifying for duct repair, replacement, or high efficiency rebates;
 - 8) the central air conditioner must be a minimum of 12 SEER (before a rebate will be paid the Building Permit must have been signed off by the City of Lodi Building Department);
 - 9) a customer may receive a rebate for either duct repair or duct replacement;
 - 10) customers that have previously used the tight duct rebate program may qualify for additional duct replacement rebates.

Design Requirements

- ❖ The following conditions must be met for the air flow and/or equipment efficiency rebates:
 - 1) air flow design (eligible for rebate without changing equipment):
 - Manual J load calculations or equivalent must be performed in order to-
 - verify proper equipment tonnage for the home's square footage and heat gain characteristics;
 - verify proper system air flow @ 400 CFM per ton + or - 15% using eScanAF™;
 - provide a Certificate of Compliance (see attachment A), completed and signed by the contractor or his legally authorized representative. This form must be submitted (not required if using eScanAF™) with every rebate application showing that the system was properly designed and that the air flow & leakage measurements were taken to verify appropriate supply and return air balance for the equipment that is being used;
 - Duct leakage-
 - must not exceed 150 CFM25 using Minneapolis Duct Blaster;
 - Multiple returns-

- design returns so they do not create a positive or negative pressure zone when doors are closed;
- 2) equipment efficiency (must correct air flow to qualify for rebate):
 - 12 SEER minimum equipment is required (if changing out the equipment)-
 - duct design & air flow leakage corrections are required when qualifying for any high efficiency equipment rebate that may be available.

Performance Testing

- ❖ *Diagnostic Testing*
 - 1) contractors are required to verify their results using the Honeywell Enalaysis eScanAF™ airflow & Minneapolis Duct Blaster testing equipment or equivalent (for other testing equipment and procedures you plan to use, you must first prove the results to the City of Lodi Electric Utility). Your method must be proven and verified to be as good as, or better, than the results achieved using the eScanAF™ equipment;
 - 2) the heating and cooling system must be fully operational, as air flow testing and compliance verification is to be done under heating and air systems own operating power;
 - 3) all registers must be fully open in order to verify maximum air flow;
 - 4) all supply and return register grills or air diffusers must be in place as they affect air flow;
 - 5) all filters must be in place for final verification test (system must be designed to handle a highly restrictive filter);
 - 6) **negative pressures** on the main body of the home due to the central heat and cooling systems supply and return air delivery **are not allowed**;
 - 7) **negative pressures** in any room location that could have an adverse effect on any combustible appliance flue gasses or chimney flues due to the central heat and cooling systems supply and return air delivery **are not allowed**.

Pre-Testing Protocol

- ❖ **Follow Honeywell Enalaysis eScanAF™ test procedures** except as noted below. (Again, for other testing equipment and procedures you plan to use, have the procedure first approved by the City of Lodi Electric Utility). Quality Assurance, third party verification will be performed using eScanAF™ equipment-
 - 1) turn air handler on high speed (air-conditioning speed);
 - 2) make sure all supply and return registers are fully open and not taped or restricted;
 - 3) test return air flow following eScanAF test procedures (with existing filter in place), & record results;
 - 4) remove filter from the system and re-test the return air flow (record results); this will show your customer what the air flow drop is over a dirty or a highly restrictive filter (**however, the system must be designed to meet air flow test with the filter in place; this is important if you plan to use a highly restrictive filter**);
 - 5) re-install non-restrictive filters and continue testing with filter in place. If, however, the filter is restricted do to dirt or filter type, leave it out in order to obtain maximum air flow and proceed with the supply and return air test. (**Again, be sure that your design takes into consideration the filter when post testing, as the system needs to pass the eScanAF™ air flow test with the filter in place.**)

Duct Replacement Protocol

- ❖ Verify home's eligibility and replacement rules under item 2 (Eligibility);
- ❖ If the system fails the air flow test (system is not working to design CFM):
 - 1) perform Manual J load calculations to determine-
 - proper equipment tonnage (Certificate of Compliance will be provided to confirm you have done this);
 - proper duct sizing (supply and return) to match equipment tonnage @ 400 CFM per ton + or - 15% using eScanAF™;
 - 2) take static pressure readings to determine if the coil is restricted and, as necessary, provide the customer with a complete service of the equipment (if not new) to include cleaning the cooling coil and the condenser coil. (Keep in mind a restricted cooling coil can reduce air flow, so you should be sure this is not part of the air flow problem prior to replacing or repairing any part of the air delivery system);

- 3) verify that there are not structural design issues that would hinder a successful retrofit of the new ductwork;
- 4) replace all supply and return ductwork following any & all manufacturer installation specifications, along with any state and local codes that may apply (*note: whenever a code discrepancy is noted, to ensure compliance, follow the most stringent code*);
- 5) Verify duct leakage is at or under 150 CFM using the duct blaster.

Repair Protocol

- ❖ If the system fails air flow test (system is not working to design CFM):
 - 1) perform Manual J load calculations to determine or verify-
 - proper equipment tonnage (Certificate of Compliance will be provided to confirm compliance);
 - proper duct sizing (supply & return) to match equipment tonnage @ 400 CFM per ton + or - 15% using eScanAF™;
 - 2) existing supply and return air delivery ductwork size and/or design flaws;
 - 3) if sizing appears to be correct, check entire system (supply and return) for disconnected, leaky, restricted or deteriorating ductwork;
 - 4) take static pressure readings to determine if the coil is restricted, and as necessary, provide the customer with a complete service of the equipment (if not new) to include cleaning the cooling coil and the condenser coil. (Keep in mind, a restricted cooling coil can reduce air flow, so you should be sure this is not part or all of the air flow problem prior to replacing or repairing any part of the air delivery system);
 - 5) correct air flow & leakage as necessary with appropriate repairs using UL181 tapes and mastics;
 - 6) replace any ductwork following any/all manufacturer installation specifications, along with any state and local codes that may apply (*note: whenever a code discrepancy is noted, to ensure compliance, follow the most stringent code*);
 - 7) verify duct leakage is at or under 150 CFM using duct blaster.

Post-Testing Protocol

- ❖ **Follow Honeywell Enalays eScanAF™** post test procedures (for other testing equipment and procedures you plan to utilize, first have those procedures approved by the City of Lodi Electric Utility). Quality assurance to be performed using eScanAF™:
 - 1) turn air handler on high speed (air-conditioning speed);
 - 2) make sure all supply and return registers are open and not taped or restricted;
 - 3) test air flow following eScanAF procedures (with existing filter in place);
 - 4) if air flow fails-
 - check your design and any repairs made and make necessary changes;
 - 5) if air flow passes-
 - complete the Certificate of Compliance (see attachment "A") **Not required if you are using eScanAF™**;
 - white copy for the customer;
 - green copy for the utility (leave with customer);
 - goldenrod copy for the contractor;
 - 6) using a Digital Manometer or equivalent measure house pressures to ensure that no negative pressures are created by the return ductwork in the main body of the home or in any room location that could have an adverse effect on any combustible appliance flue gasses or chimney flues due to the central heat and cooling systems supply and return air delivery;
 - 7) Verify duct leakage is at or under 150 CFM using the duct blaster.

Customer Education/Health & Safety

- ❖ Inform the customer of the following:
 - 1) closing doors to rooms in the home, thus isolating the supply air from the return air ducts, can cause the home to experience negative pressure and may cause combustible gas appliances or chimney flues to back-draft, causing hazardous indoor air quality and safety issues;
 - 2) recommend multiple returns where this may be an issue; design returns so they do not create positive or negative pressures zones when doors are closed;

- 3) recommend to customer that if they have any gas, combustible appliances (ranges, water heaters, furnace, etc.) located in the conditioned space of the home, serviced on a regular basis to avoid causing hazardous indoor air quality and safety issues.

Maintenance

❖ Service Checks:

- 1) recommend annual service/maintenance checks to keep the system operating at peak efficiency.

Contractor Certificate of Compliance

To be completed by the installing contractor and left with the customer

Contractor Name: _____ SCL # _____
 Address _____ Age of Home _____
 City _____ State _____ Zip _____
 Phone # _____ Fax # _____
 City Permit # _____ Date Issued _____

In order to be eligible for the City of Lodi Electric Utility High Efficiency Rebate program, I have determined that the following components must be installed and have been verified to meet the design airflow of 400 Cubic Feet (CFM) per ton:

System designed Tonnage Tons System Designed air flow (400 CFM per ton) CFM

Design Method used _____

Measured post airflow Supply CFM Return CFM What verification method was used? _____

Register Location (use additional paper if necessary)	Supply Designed CFM	Return Designed CFM
1.)		
2.)		
3.)		
4.)		
5.)		
6.)		
7.)		
8.)		
9.)		
10.)		
11.)		
12.)		
13.)		
14.)		
15.)		
16.)		
17.)		
18.)		
Total Airflow's (should equal system design airflow above to within 15% under real time operating conditions).	<input type="text"/>	<input type="text"/>

I _____ a legally authorized agent of _____;
Print Name Company name
 hereby certify the above information to be true and correct to the best of my knowledge.

Signature Date (mm/dd/yy)