Guaranteed Comfort

from

The Home
Performance Experts

"Your Comfort is Our Business"

Your Heating and Cooling System Is a Key Part of the Family Home

- Comfort - Your Family's Comfort Depends on the Proper Operation of your Heating and Cooling System.

- $$$ - The cost to operate and maintain your heating and cooling system over its lifetime is many times larger than the purchase price of the system.

- Air Quality - Your heating and cooling system can play a vital role in maintaining good indoor air quality.

What Should You Expect from your Heating and Cooling System?

- Even Temperatures Throughout the House. No hot or cold rooms!
- Controlled Humidity Levels. No damp feeling when the air conditioner is running!
- Reasonable utility bills. No more big surprises during hot or cold weather!

- Good Indoor Air Quality. Your heating and cooling system should contribute to better air quality with proper filtration and sealed duct systems. Some houses may need added fresh outdoor air.

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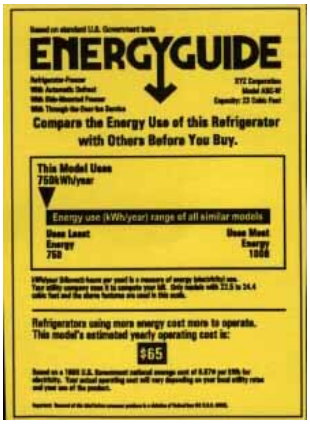
Is There a Thief In Your Ductwork?

- According to the U.S. Department of Energy, typical duct systems lose 25% to 40% of the energy put out by the central furnace, heat pump or air conditioner.

- Studies conducted by utility companies and energy experts throughout the country have verified the two main duct system problems:
  - Large air leaks in the duct system.
  - Insufficient airflow due to restrictions in the ductwork.

What Is the True Efficiency of the Equipment Installed In Your Home?



- The efficiency label on a new heating or cooling system tells you only half the story.
- Heating and Cooling systems will only operate at the label efficiency if they are:
  - Installed correctly.
  - Connected to a well designed and sealed duct system.
  - The equipment is the right size for the house.
- Most heating and cooling systems have 1 or more problems that reduce the true efficiency.

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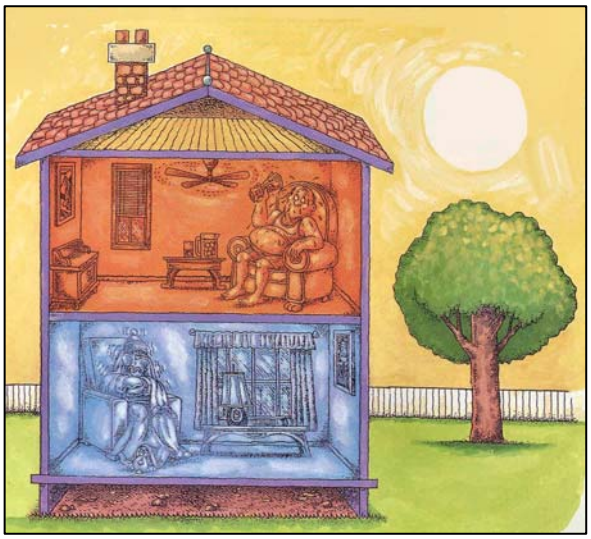
The 5 Most Common Problems Keeping Your Heating and Cooling System From Delivering Comfort



- The Duct System has Large Air Leaks.
- The Duct System is Restricting Airflow.
- The Wrong Sized Heating and Cooling Equipment was Installed.
- The Heating or Cooling Equipment was Installed Incorrectly.
- The House has Large Hidden Air Leaks which Create Hot or Cold Rooms.

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Comfort Delivery
Problem #1

The Duct System has Large Air Leaks

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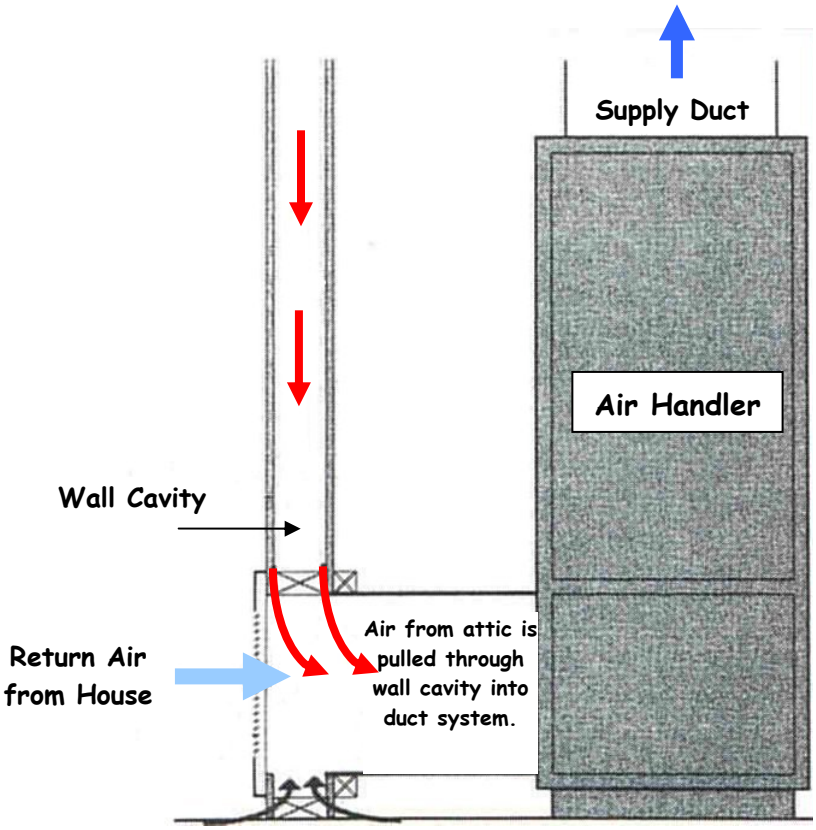
Duct Leakage Problems

- Duct leaks prevent your heating or cooling system from doing its job properly. Heated or cooled air leaks out of holes or gaps in the supply ductwork before it ever reaches your house.

- Leaks in the ductwork also pull outside air (hot in summer, cold in winter) into the ducts, forcing your equipment to run longer to keep you comfortable.



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Duct Leakage Problems

- Duct leaks can draw humid outside air into the house, overwhelming the ability of your cooling system to dehumidify. This can cause your house to feel damp even when the air conditioner is running.

- Duct leaks can also pull pollutants and irritants such as mold, insulation fibers, car exhaust, pollen and dust directly into your house.

Dust mite

Duct Leakage Problems

- Specialized equipment can be used to quickly test for air leaks in the duct system, and estimate the annual efficiency loss from duct leakage.

Test Results

1. Test Type:	Total Leakage (Duct Blaster Only)
2. Test Pressure:	25.0 Pa
3. Measured Duct Leakage:	389.2 CFM (73.4 sq. in.)
4. Duct Leakage as a Percent of System Airflow:	24.3 %
5. Duct Leakage as a Percent of House Floor Area:	13.9 %

Estimated Efficiency Loss from Duct Leakage:

1. Annual System Efficiency Loss:	19.5 %*

2. Estimated Impact on Equipment Efficiency Rating:

Air Conditioner SEER		Heat Pump HSPF		Furnace AFUE	
Rated	Actual	Rated	Actual	Rated	Actual
16.0	12.9	8.5	6.8	95.0	76.5
14.0	11.3	8.0	6.4	90.0	72.4
12.0	9.7	7.5	6.0	85.0	68.4
10.0	8.0	7.0	5.6	80.0	64.4
8.0	6.4	6.5	5.2	75.0	60.4

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For Duct Systems that have Large Air Leaks

- Test for duct air leakage using a Duct Blaster® system. The Duct Blaster pressure tests your duct system much the same way a plumber pressure tests your water pipes for leaks.

- Permanently seal holes or gaps in ductwork with specially designed sealants

(no duct tape).

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For Duct Systems that have Large Air Leaks

- Repairs often involve reconnecting ductwork that has become disconnected, or sealing building cavities being used as part of your duct system.
- Sometimes the best solution is to install new airtight ductwork.
- Always verify work quality by re-testing for air leakage before leaving.

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Comfort Delivery Problem #2

The Duct System is Restricting Airflow

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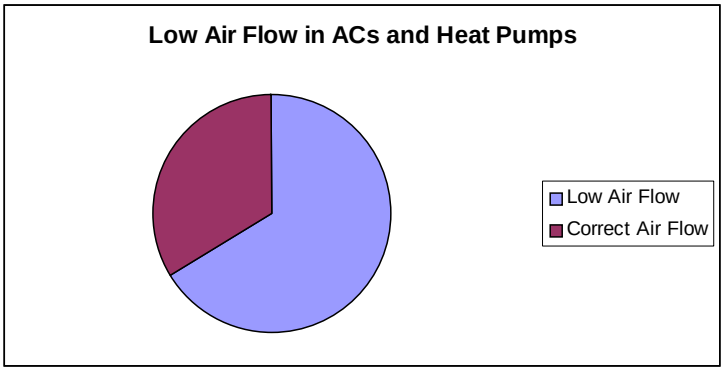
Restricted Airflow Problems

- The proper amount of airflow through your heating and cooling system is critical to its ability to keep your home comfortable.
- Studies across the country have documented restricted airflow problems in new and existing houses. In one recent study, over two-thirds of the houses checked had low airflow.



- The main causes of low airflow include:
  - Return ductwork is too small.
  - Too many ductwork bends and turns.
  - Poorly designed filtration systems.

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Restricted Airflow Problems

- Low airflow can lead to:
  - Much lower comfort levels.
  - Increased utility bills.
  - Premature equipment failure.
- Airflow rates should always be tested and verified by a qualified technician.
- In addition, checking to see that each room in the house is getting the correct amount of airflow is an important part of every installation.

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For Duct Systems Restricting Airflow

- Measure total system airflow using a calibrated TrueFlow meter (or the Duct Blaster system).
- Measure system "static pressure" (similar to the system's blood pressure) and examine the duct system for restrictions.
- Remove duct restrictions (e.g. increase size of return ductwork) and correct other airflow problems.

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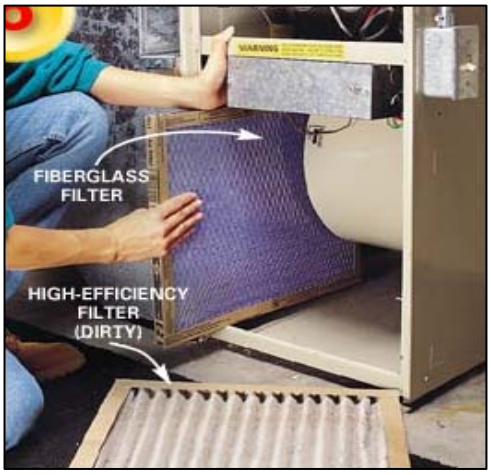
Guaranteed Comfort Solutions

For Duct Systems Restricting Airflow

- Install a new filtration system designed for your house and duct system.



- Re-test final system airflow, and test for proper airflow balance to each room in the house.

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Problem #3

The Wrong Sized Heating and Cooling Equipment was Installed

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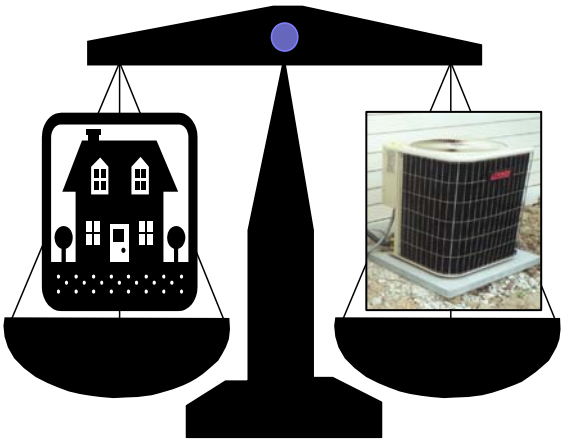
Bigger is Usually Not Better

- Many heating and cooling systems are installed without first determining the proper size unit needed for the house.
- Some contractors use simple rules of thumb to size replacement equipment, or worse, they always recommend getting something a little bigger – just in case!
- Equipment sizing should be based on an evaluation of the home's insulation levels, air leakage rate, windows, solar orientation and humidity control needs.



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Oversized Equipment Creates Problems

- Oversized air conditioners and heat pumps do not run long enough to remove moisture from the air.

  Result: Your house feels damp and muggy.

- A June 1998 Consumers Reports Magazine article cautions about being sold an over-sized unit. *"While an oversized air conditioner may cool a space more rapidly… oversized machines might not reduce humidity very well."*
- Oversized units also tend to cycle on and off more frequently, resulting in large temperature swings and more wear on the equipment.

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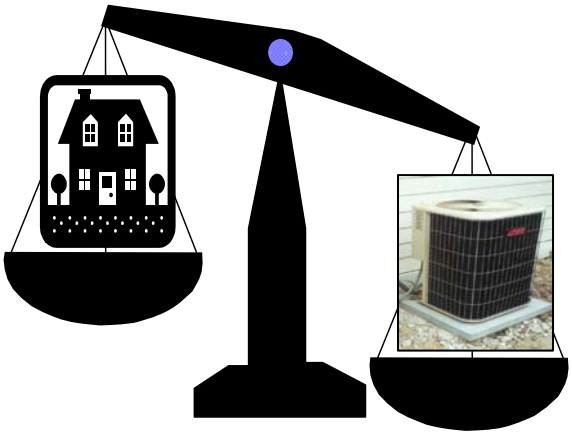
Proper Sizing is the Bottom Line

- <u>The bottom line:</u> If your system isn't sized properly, there is a good chance it will not work properly.
- In cases where an existing system isn't providing proper comfort, simply installing a bigger system without diagnosing the cause of the problem will often make matters worse.



- Fixing the cause of the comfort problem (poor insulation, duct leaks, restricted airflow or excessive house air leaks) is almost always a better solution than installing a bigger heating or cooling system.

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Guaranteed Comfort Solutions

When Wrong Sized Equipment Is Installed in your House

- Measure the whole house air leakage rate using a Blower Door. The Blower Door system uses a large fan, temporarily installed in a doorway, to pressure test the whole house for air leaks. The air leakage rate is an important factor in determining the correct equipment size.
- Carefully survey the house's insulation levels, windows, solar orientation and humidity control needs.

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Guaranteed Comfort Solutions

When Wrong Sized Equipment Is Installed in your House

- Conduct a thorough Equipment Sizing Calculation based on the survey and Blower Door test results. This allows us to exactly match the equipment to your house, not your neighbors.

Blower Door Reading	5,000	CFM@50PA		
Volume	16,000			
Design Temp.	-5			
Surface	Sq Footage	R Value	U-Value	Heat Loss BTUH/Hr.
Gross Walls	1200	11		
Windows	200		0.66	9900
Doors	40		0.25	750
Attic	2000	38		3659
Floor	2000	19		5769
Net walls	960	11		5143
Infiltration				20700
Duct Loss Multiplier	20.00%			9184
0-50%				
	\			
Total				55,105
Max Gas Furnace Output				77,147

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Problem #4

The Heating or Cooling Equipment was Installed Incorrectly

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Air Conditioning and Heat Pump Systems Need the Proper Amount of Refrigerant

The amount of refrigerant gas installed in an air conditioning or heat pump system is critical to proper operation.

- A number of recent studies by large utility companies have shown that approximately 75% of all new installed systems have either too much or too little refrigerant installed.
- Improper refrigerant levels reduce the efficiency and capacity of the equipment and can lead to premature failures.
- Trained technicians should always verify and adjust the refrigerant charge.

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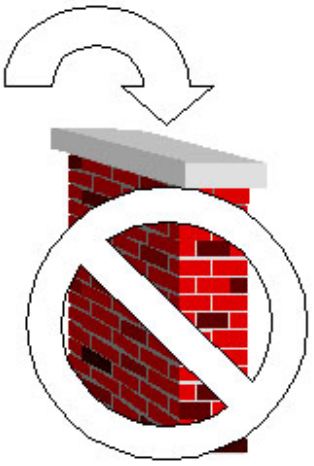
Proper Venting of Exhaust Gases from Oil and Gas Appliances is a Must

- Improperly installed venting systems for gas and oil furnaces and water heaters can let poisonous exhaust gases into your house.
- Negative pressures in houses from duct leaks and imbalanced duct system airflows can cause backdrafting and spillage of exhaust gases into your house.



BACKDRAFTING

- Measurement of chimney draft and carbon monoxide production should always be done on oil and gas appliances.

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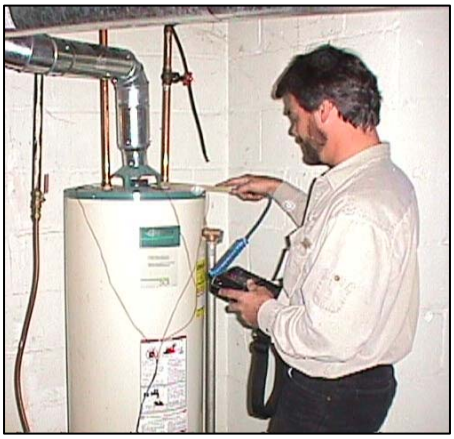
Guaranteed Comfort Solutions

For Heating and Cooling Equipment not Installed Properly

- Measure and adjust the refrigerant level in air conditioners and heat pumps to ensure peak performance.

- Test for carbon monoxide and proper operation for all oil and gas appliances.



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For Heating and Cooling Equipment not Installed Properly

- Fix all chimney venting problems.
- Install only equipment that was designed to work together (e.g. replace both the inside and outside units on air conditioners and heat pumps).
- Always conduct a final quality control check to be sure the equipment is operating at peak efficiency.

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Problem #5

The House has Large Hidden Air Leaks which Create Hot or Cold Rooms

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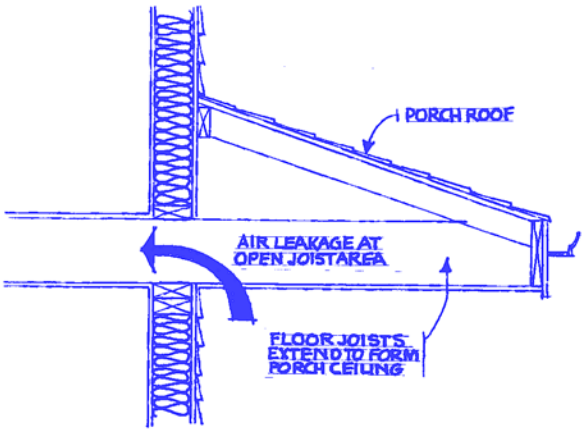
Big House Air Leaks Can Create Big Comfort Problems

- Even if your heating and cooling system is well designed and installed, parts of your house may still be uncomfortable if there are very large air leaks.

- Uncontrolled air leakage from hidden leak sites in the house can create serious comfort problems. This air leak from an open porch ceiling cavity will likely create an uncomfortable room, no matter which heating or cooling system is installed.



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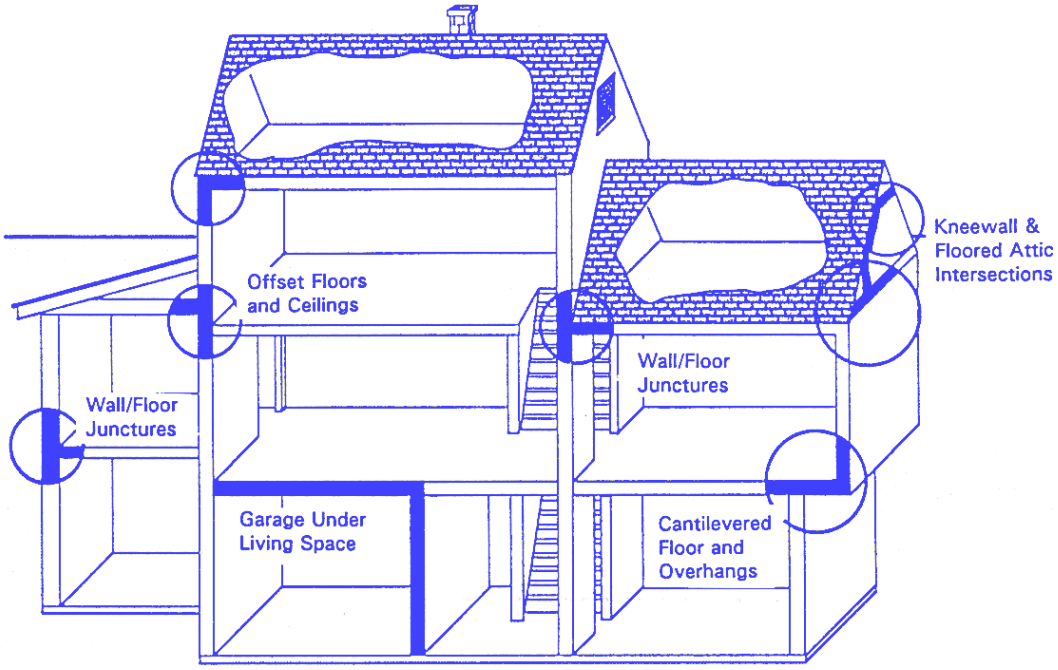
Air Leak Problems

- The picture below shows a number of common locations for hidden air leakage paths into houses.



- A diagnostic tool, called a Blower Door, can be used help locate these important air leakage sites and determine if they are a likely cause of comfort problems.

Guaranteed Comfort Solutions

For Houses That Have Large Air Leaks Creating Warm or Cold Rooms

- Conduct a Blower Door test to help find large air leakage sites in your house, and determine if they are a likely cause of comfort problems
- Recommend air sealing improvements for large air leakage problems. Missing or inadequate house insulation will also be pointed out.

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More Comfort Solutions

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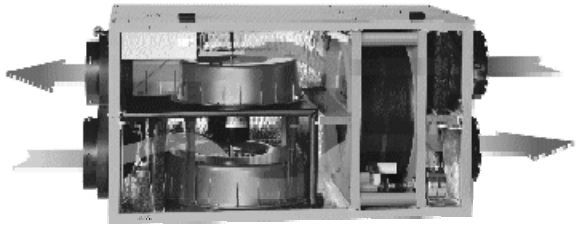
More Comfort Solutions

- House ventilation systems. Because we spend up to 90% of our time indoors, the quality of the air in your house is very important. Some houses need a ventilation system to help remove indoor pollutants or to relieve moisture problems. Information collected during our comfort guarantee testing will help us determine if a ventilation system is appropriate for your house.



- Annual maintenance contracts. Having us check and adjust your heating and cooling system every year assures maximum performance, and gives you peace of mind.

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More Comfort Solutions

- Zoning Controls. Zoning allows you to separately control the heating and cooling needs of different parts of the house to maximize comfort (e.g. control upstairs separately from downstairs).
- Duct Insulation. If your duct system is not insulated properly, we will provide you with an estimate for adding insulation to ductwork which runs through attics, crawlspaces and garages.

Our Company
Can Deliver a
Guaranteed Comfort Solution

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Guaranteed Comfort Requires Trained Technicians and High-Tech Tools to do the Job

- Our technicians receive the latest training on the newest diagnostic procedures so we can find and fix comfort problems, and keep your utility bills low.

- Our company invests in the best diagnostic tools to evaluate and test your house. Guesswork and rules of thumb are not in our toolbox. Our motto is:

The best test, the rest guess!





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Here's What Some Guaranteed Comfort Customers Have to Say

- *"The testing equipment was the turning point…it made us feel good that our contractor knew what he was doing. We felt very confident."*
- *"Our house was always humid and sticky…we were never comfortable. Now when the family comes over, they comment on how comfortable it is."*
- *"We never dreamed our air quality problem was coming from the ductwork… The testing equipment was the only way the problem was found."*

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