

Woltz Residence Defect List

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Repair Status Summary

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Status per repair item

1. Repair Status Summary - Status does not apply
2. HVAC
 1. HVAC Overview - Status does not apply
 2. HVAC 5 ton & 2 ton Systems - Excessive and Unnecessary Capacity
Status: Contractor Refused to Correct
 3. HVAC 5 ton & 2 ton Systems - No Room Low-Resistance Return Paths
Status: Contractor Refused to Correct
 4. HVAC 5 ton Split System - Undersized Main Return Grille
Status: Contractor Refused to Correct
 5. HVAC 5 ton Split System - Master Closet Attic Space Inadequate
Status: Contractor Refused to Correct
 6. HVAC 5 ton Split System - Room Supply Registers Incorrectly Ducted
Status: Contractor Refused to Correct
 7. HVAC 5 ton Split System - No Auxiliary Drain Pan Drain
Status: Contractor Refused to Correct
 8. HVAC 5 ton Split System - Incorrect Condensate Drain Traps
Status: Contractor Refused to Correct
 9. HVAC 5 ton Split System - Undersized Access Panel Opening
Status: Waiting Contractor Response
 10. HVAC 2 ton Packaged System - Noisy and Not Heating
Status: Contractor Refused to Correct
 11. HVAC 2 ton Packaged System - Back to Back Room Supply Registers
Status: Contractor Refused to Correct
 12. HVAC System - Incorrect Roof Installation
Status: Contractor Refused to Correct

13. HVAC System - No Provision for Indoor Air Quality

Status: Contractor Refused to Correct

14. HVAC 5 ton Split System - Damaged Air-handler Overflow Pan

Status: Repair Complete

15. HVAC System - Remedy

Status: Contractor Refused to Correct

3. Roof

1. Excessive Water Ponding

Status: Contractor Refused to Correct

2. Inadequate Roof Coating Thickness

Status: Contractor Refused to Correct

3. Install HVAC Slip Sheets

Status: Contractor Refused to Correct

4. Install Counter flashings

Status: Contractor Refused to Correct

5. Correctly Install Gable End Closures

Status: Contractor Refused to Correct

6. Replace HVAC Support Frame

Status: Contractor Refused to Correct

7. Correctly Install Mansard Ridge

Status: Contractor solution rejected

8. Correctly Install Built Up Membrane

Status: Contractor Refused to Correct

4. Family Room Fireplace

1. Fix Flue Pipe Separation

Status: Waiting Contractor Response

2. Fix Fireplace Vertical Alignment

Status: Waiting Contractor Response

5. Hall Bathroom

1. Reverse Hot/Cold Valves

Status: Contractor Refused to Correct

6. Electrical

1. Loose Exterior Electrical Boxes

Status: Waiting Contractor Response

2. Flood Light Not Working

Status: Waiting Contractor Response

3. Exposed Exterior Wiring

Status: Repair Complete

7. Laundry Sewer Drain Not Reconnected

Status: Repair Complete

HVAC System - Overview

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Description

Researching industry standards and examination by qualified independent inspectors has shown the HVAC system in significant ways does not conform to ACCA Manual J load calculations, ACCA Manual S equipment selection procedures, ACCA Manual D duct design and installation requirements, ACD Flexible Duct Performance and Installation Standards (Greenbook 4th Edition), and Manufacturer's installation instructions (This is not meant to be an exhaustive list).

In addition to design, implementation, and workmanship failures, instructions for equipment location and duct layout were disregarded and installation proceeded without prior notice or opportunity to review any aspect of the HVAC implementation. Additionally the HVAC system does not properly reflect the USAA Adjusters Estimate for returning the home to pre-loss condition. This document focuses on the design, implementation, and workmanship failures.

General Contractor 2015-03-16 Response to Homeowner

Attached is the response from my HVAC contractor. As you can see, your report, like the roofing inspection report, are merely specifications that can be implemented before a job is started. Then the contractors involved can advise and estimate the job accordingly to include these additional requirements. At this point, given the parameters we were given by you, and may I add, by your other HVAC contractor friend, the HVAC system will remain as we installed it with the exception of adding a sheet metal barrier in one of your vents to block the visual issue between the two rooms.

Homeowner 2015-03-20 Response to General Contractor

The general contractor response is nonsensical and a coherent response is difficult. Some factual points may suffice:

- It should be noted the real issue is the work that was actually done by the contractor and nothing else. This report shows, based on qualified independent inspectors and industry code requirements, the HVAC duct design and installation methods fall far short of minimum acceptable standards.
- No HVAC parameters were ever given to the contractor by the homeowner other than if possible, all ducting should be on the flat roof enclosed in wood chases covered with foam and don't locate HVAC units above bedrooms.

Resources

[ADC Flexible Duct Performance and Installation Standards\(Greenbook 4th Edition\)](#)

[ACCA Manual D Residential Duct Systems](#)

[ICP FEM4X60000b2 Fan Coil installation instructions](#)

[ICP FEM4X60000b2 Fan Coil specifications](#)

[ICP NXH560GKA100 Heat Pump technical support manual](#)

[ICP PHD424000KTP0D1 Package Heat Pump Specifications](#)

- The IAPMO's Uniform Mechanical Code requires the use of Manual J (Residential Load Calculation), Manual D (Residential Duct Systems).
- The ICC's International Mechanical Code requires the use of Manual D (Residential Duct Systems).
- The ICC's International Residential Code requires the use of Manual J (Residential Load Calculation) and Manual S (Residential Equipment Selection).
- The ICC's International Energy Conservation Code requires the use of Manual J (Residential Load Calculation) and Manual S (Residential Equipment Selection).

[HVAC Image Slideshow](#)





- The "other HVAC contractor friend" was not my friend but the service company that had previously serviced our prior HVAC requirements.
- The HVAC and roofing "reports" were generated by qualified independent 3rd parties. They are mine only in the sense I requested they be done.
- To my knowledge a "visual issue" has never been brought up until now. The issue is one of noise and privacy.
- Unfortunately the homeowner was not informed by the contractor or subcontractor about any aspect of the HVAC installation until after it had been installed and any corrections became very difficult. These problems may have been avoided if there had been an opportunity for review.
- From an homeowner to general contractor email on 2013-11-02: "I've been meaning to point out I've never seen any drawings or written specifications for the air conditioning system. I'd like to know manufacturers names, model numbers, capacity specifications, duct routes, etc. Please email the documents to me for review ASAP." I was unaware the HVAC installation had begun and no documents were ever received.
- From an homeowner email to general contractor on 2013-11-03: "After conducting an on-site review of the air conditioning system installation today we found the current implementation to be flawed in just about every aspect from design, choice of components and materials, and workmanship. We'd like to have work stopped until a through review is done and we come to an agreement on how it is to be implemented. I'll delineate the issues in a follow-up email, but I wanted to notify everyone that there's a problem as quickly as possible.". We were appalled by what we saw and managed to get a few problems fixed, but were told it would cost us additional thousands to make any corrections, that we had approved the HVAC layout, and it would work fine because the manufacturer had approved the design. None of which were correct.

HVAC Sub-Contractor 2015-03-16 Response to Homeowner

The systems installed by (name withheld) Air Conditioning where designed to try to fit into the new conditions which were created by the elimination of all drops throughout the house (per owner request). The original HVAC pre-fire consisted of 2 roof mounted package 3 ton units for a total of 6 tons. In trying to replace what was destroyed by the fire it was decided to split the house into different zones than original in order to isolate off the East rooms when not in use. The way the house is split now in order to match previous air flow designs it was necessary to up-size main unit to 5 ton in-lieu of 4 ton (as there

is no 4.5 ton). The 2 ton unit could have been 1.5 ton but there is no cost difference between the 2 and the additional 1/2 ton allows unit to catch up quicker when left off during non-use periods.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

As previously mentioned the homeowner was not informed by the contractor or subcontractor about zoning the house or any other aspect of the HVAC installation until after it had been installed and any change became very difficult. The HVAC zones implemented by contractor are identical to the original zones and no request was made to isolate the east bedrooms for "no use periods". I'm not sure what is meant by "split", but the current layout of the house is identical to the original layout. Citing the tonnage used in a home built in the early 1980s is not a technically sound method of determining capacity requirements for a home rebuild in 2013, especially when energy efficiency was a primary concern during reconstruction.

HVAC 5 ton & 2 ton Systems - Excessive and Unnecessary Capacity

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Status: Contractor Refused to Correct

Description

HVAC system total capacity is oversized for the 2300 sq ft living space load requirements. A total of 7 tons were installed when only 4 is required. The home is considered new construction with a tight building envelope, well insulated walls and roofs, all energy efficient low-e vinyl windows and doors, and all east/west windows are shaded resulting in lower heating and cooling load requirements.

The Manual J total cooling load for the home is 40,064 Btuh. This equates to a 3.35 tons required total capacity using the Manual J calculated SRH of 1.0 and 3.92 tons total capacity using the Ideal Energy recommended SHR of 0.85. A 4 ton system is the Ideal Energy recommendation.

From Ideal Energy Inspection Summary:

- Equipment sizing: The total load on the ENTIRE home is 3.9 TONS of required cooling capacity. The equipment installed is **OVERSIZED by 3.1 TONS**.

In this case installing 7 tons for 2300 sq-ft of living space is detrimental and among the problems caused are:

- Increased Installation costs
- Reduced operating efficiency due to equipment short-cycling
- Excessive wear
- Increased maintenance and shorter equipment life
- Humidity control and Indoor Air Quality problems
- Temperature swings
- Poor air circulation resulting in hot and cold spots
- Increased Equipment Noise
- Increased operating costs

• Manual J regarding oversizing heating and cooling equipment:

Oversized equipment causes short-cycles, marginalizes part-load temperature control, creates pockets of stagnant air (unless the blower operates continuously) and degrades humidity control during the cooling season (more information on this subject is provided below). Oversized equipment also requires larger duct runs, increases installation cost, increases operating cost, increases the installed load on the utility grid and causes unnecessary stress on the machinery.

[Ideal Energy Inspection Summary](#)

[Ideal Energy Inspection Report](#)

[Residential HVAC Design Summary Overview of Industry Standards](#)

- Manual J, 8th Edition, Version 2, page 463, section A6-2, Undersizing Heating and Cooling Equipment
- Manual J, 8th Edition, Version 2, page 463, section A6-3, Oversizing Heating and Cooling Equipment

- **Manual J regarding undersizing heating and cooling equipment:**

The obvious problem with significantly undersized equipment is that it will not maintain the desired setpoint temperature when a passing weather system imposes a design load on the heating and cooling equipment. However, slightly undersized cooling equipment - by a margin of 10% or less - may actually provide more comfort at a lower cost (See section A6-9 for a discussion of part-load operation).

Refer to:

- Residential HVAC Design Summary Overview of Industry Standards
- ACCA Manual J, 8th Edition, Version 2
- Ideal Energy Inspection Summary
- Ideal Energy Inspection Report

HVAC Sub-Contractor 2015-03-16 Response to Homeowner

If the owner wanted he could have chosen to hire and pay for a Mechanical engineer and Architect to redesign the entire structure and HVAC systems. The existing systems totaled 6 tons nominal with older units that actually had more capacity than newer high efficiency systems. We were to replace back to equal to pre-loss conditions. Although a manual J may call for 4 tons on a 2300 sq. ft. house with flat roof, vaulted ceilings and sky windows there would be no way that with my 32 years experience in extreme AZ. conditions that I could install 1-4 ton unit without being directed in writing from an engineer. The engineers phone doesn't ring on 115 degree days when the unit never shuts off and the t-stat is climbing.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

It was not the homeowners responsibility, but had the homeowner been given the opportunity, I would have definitely involved a qualified HVAC mechanical engineer, but redesigning the entire structure is nothing more than hyperbole. The new HVAC systems were never intended to restore the home to an identical pre-loss condition. If they had there would be 2 packaged HVAC units and 2 evaporative coolers on the roof.

Whom does the subcontractor think developed Manual J? None other than HVAC manufacturers and mechanical engineers! Manual J, S, D, and T are written instructions from HVAC manufacturers and mechanical engineers for the correct installation of HVAC systems!

HVAC 5 ton & 2 ton Systems - No Room Low-Resistance Return Paths

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Status: Contractor Refused to Correct

[ACCA Manual D Residential Duct Systems](#)

Description

ACCA Manual D, page 27, section 4-9 Low-Resistance Return Path, states:

An engineered, low-resistance return path shall be provided for every room or space that receives supply air. These methods may be used for rooms and spaces that have a privacy door installed in an interior partition.

- The path from a return grille in an particular room or space to the return-side of the blower may be through a dedicated return air duct.
- An isolated room or space may have a transfer duct to a space that has a central return.
- A privacy door or partition wall may have an opening fitted with two return grilles so air flows from an isolated room or space to a central return. Provide a sealed sleeve for wall openings.
- Appendix 3, Fitting Group 14 provides guidance for designing return air transfer paths.

A door undercut does not provide a reasonable solution to the return air problem because the required gap is objectionably large. If a door undercut is used as a return path, the gap shall not be less than the Table A1-2 value.

- Adequate door cuts create appearances issues.
- Adequate door cuts create privacy issues (a significant amount of noise is transmitted though a small crack, a door cut proves negligible attenuation).
- Air flow under doors soils carpets.

In this particular case an "adequate door cut" would range between 3.2" and 4.8". Obviously not a viable solution.

HVAC Sub-Contractor 2015-03-16 Response to Homeowner

The house never had individual returns or transfer ducts in rooms. We were replacing to pre-loss conditions.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

The new HVAC systems were never intended to restore the home to an identical pre-loss condition. Examples of the homeowner not wanting to restore to pre-loss conditions are: all

replaced doors and windows are energy star qualified, a new structural awning was constructed over a west facing window, and windows were resized and moved for energy efficiency. There never was a mandate from the homeowner to return the home to the identical pre-loss condition and this point would have been restated and the return paths issue raised if the homeowner had been consulted properly by the contractor.

HVAC 5 ton Split System - Undersized Main Return Grille

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Status: Contractor Refused to Correct

Description

The air return grille for the 5 ton air handler is significantly undersized, wasting energy, damaging equipment, and raising operating costs.

Specifically, the 5 ton unit has a 29x19 (551 sq-in) return grille providing 1102 CFM using the 2 CFM/sq. inch industry standard for return grilles. ACCA Manual D specifies 450 CFM/ton (page 28) for hot dry climates like Phoenix, therefore to operate efficiently, the unit actually requires 2250 CFM. Thus only 49% of the required air flow is being provided. This compressor model consumes energy at the full 5 ton rate regardless of the air flow, but only delivers 49% of energy used because of the undersized return grille.

These numbers vary slightly from the HVAC inspection report, but the conclusions are the same. For example, these numbers are based on the return grill opening, 29x19. The report used the grille size including frame of 30x20.

Ideal Energy Inspection Summary:

- **Duct sizing: The 5 TON system's return is significantly undersized.** Typically return filter grilles are sized at 2 CFM per square inch. The FEM4X6000 air-handler that was installed has a maximum rated airflow for 1,897 CFM with .1 in/WC Static Pressure and thus the minimum return surface area should be around 950 in², the existing 30"x20" return is undersized by 350 in².
- **Static Pressure: Total Static Pressure (TSP) was measured at .5 in/WC (-.4 return and +.1 supply).** If the high speed air tap (tap 5) is selected this results in 1,774 CFM of air flow. This will result in higher energy bills over the life span of the system.

ACCA Manual D, Table A1-1, page 9 and 123, specifies a maximum return grille air velocity of 500 Fpm. This is being exceeded now affecting system performance and causing excess noise, and should not be raised to satisfy air flow requirements.

According to SRP technical support, to estimate the energy use of a HVAC unit you have to identify how much is being spent on heating and cooling. To do this, take the March bill, which is typically a month when neither cooling nor heating equipment is used, and subtract it from the monthly bills. After the subtraction, what is left is an estimate of how much is spent on heating and cooling. Multiply this estimate by 50% to get an idea of what the substandard return air is costing. Using the

[Ideal Energy Inspection Summary](#)

[Ideal Energy Inspection Report](#)

[ACCA Manual D Residential Duct Systems](#)

[ADC Flexible Duct Performance and Installation Standards\(Greenbook 4th Edition\)](#)

[Airflow is Critical](#)

SRP methodology and the March SRP bill of \$95 results in a annualized waste of \$457.

This problem cannot be corrected because of the location chosen to install the air handler. There is not room for additional ducting or a second 29x19 return grille. Both are required, there is room for neither.

HVAC Sub-Contractor 2015-03-16 Response to Homeowner

The 30"x 20" return grill is standard for a 5 ton system and probably 90%+ of 5 ton units in the valley have 30"x 20" return grills with no problems. The unit supplied and installed is an AHRI (#6612730) tested and certified match that is rated 14.0 SEER/11.5 EER/8.0 HSPF @ 1,750 CFM. (see attached) According to the static pressure read by this report the unit is providing 1,774 cfm which is above the AHRI certified conditions meaning that the unit is working @ full capacity and efficiency.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

From the document "Airflow Is Critical To HVAC System Performance":

Founded in 1991, the Consortium for Energy Efficiency (CEE) is a non-profit, public benefit corporation that actively promotes the use of energy-efficient products and services. CEE reports that according to recent research, "**most residential central air conditioning systems are not installed properly**". This not only increases energy use but also reduces comfort and contributes to peak demand for electricity. Here is a breakdown of major problem areas and the frequency with which they occur:

- **Over-sizing of equipment - 47%**
- **Inadequate airflow - 70%**
- Improper refrigerant charge - 44%

Correcting these problems could reduce air conditioning peak demand by 14 percent in existing homes and 25 percent in new construction. Proper installation and maintenance could also reduce air conditioning energy bills by an average of 24 percent in existing homes and 35 percent in new construction. Consortium for Energy Efficiency (CEE)

HVAC 5 ton Split System - Master Closet Attic Space Inadequate

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Status: Contractor Refused to Correct

Description

The attic space above master bedroom closet chosen by the contractor for the 5 ton air handler is too small. The 72 x 96 attic space does not provide adequate room to properly run the necessary ducting for a 5 ton unit. Most, if not all, flex-duct located in the master closet attic space is not properly installed.

The 2 supply ducts and return duct are crushed (deformed) beyond industry standards. One 18 inch supply duct is squeezed down to 6 inches and is folded (bent) over the air handler (see photos).

Ideal Energy Inspection Summary:

- Static Pressure: Total Static Pressure (TSP) was measured at .5 in/WC (-.4 return and +.1 supply). If the high speed air tap (tap 5) is selected this results in 1,774 CFM of air flow. This will result in higher energy bills over the life span of the system.

HVAC Sub-Contractor 2015-03-16 Response to Homeowner

The attic space above the master closet is by no means an ideal location but all other options given to the home owner were rejected. In order to supply adequate spacing for equipment and duct work it would have been necessary to either add back drops, re-truss the house or shadow sky windows. None were acceptable by owner. Again unit is AHRI rated @ 1,750 CFM.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

HVAC Sub-Contractor must be confusing another installation with this one. The only accurate, though understated, statement is that "The attic space above the master closet is by no means an ideal location".

We have never been given the opportunity to review options, before or after, the HVAC installation, much less accept or reject them. The chosen list of options "presented" is hyperbole and meant to distract from the real issue that other very practical options did and do exist, but were not considered.

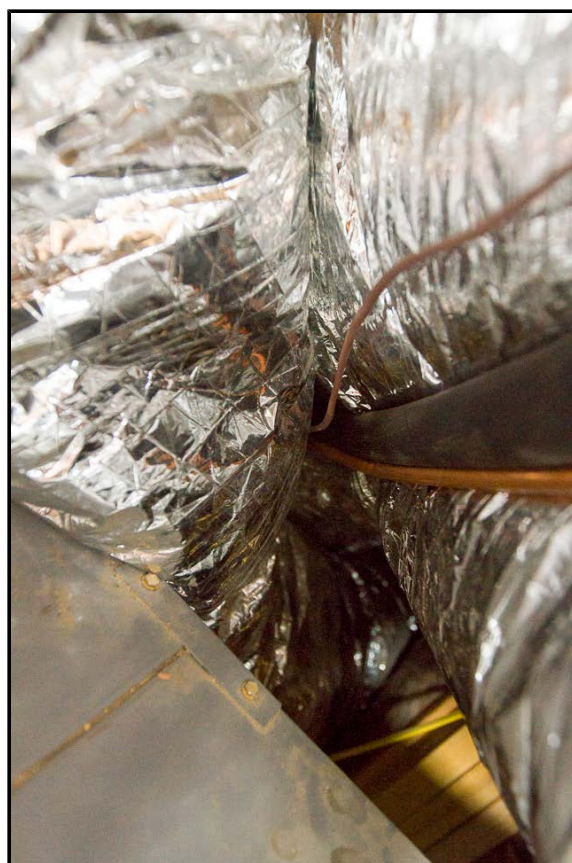
[Ideal Energy Inspection Summary](#)

[Ideal Energy Inspection Report](#)

[ACCA Manual D Residential Duct Systems](#)

[ADC Flexible Duct Performance and Installation Standards\(Greenbook 4th Edition\)](#)

[Airflow is Critical](#)



HVAC 5 ton Split System - Room Supply Registers Incorrectly Ducted

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Status: Contractor Refused to Correct

Description

The master bedroom and bath room supply registers are ducted directly off the air handler along with 18in and 12in supply trunks. This was necessary because of the improper location of the air handler. These supply registers should be connected to trunk lines and not directly to the air handler. This causes disproportionately high air flow and noise from these registers. Balancing at the register does not work because the whistling noise becomes too loud before the airflow is reduced to acceptable levels.

HVAC Sub-Contractor 2015-03-16 Response to Homeowner

Again these registers were placed where there are due to air handler location which was definitely not optimal but would have required additional drops or roof structures which were rejected by the owner.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

Again, not true or accurate.

We have never been given the opportunity to review options, before or after, the HVAC installation, much less accept or reject them. The chosen list of options "presented" is hyperbole and meant to distract from the real issues, other, very practical options did and do exist, but were not considered.

HVAC 5 ton Split System - No Auxiliary Drain Pan Drain

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Status: Contractor Refused to Correct

Description

No separate drain was attached to the auxiliary drain pan as required by the manufacturer. Quoting the installation instructions:

- Failure to follow this caution may result in property damage. A field fabricated auxiliary drain pan, with a separate drain is **REQUIRED** for all installations over a finished living space or in any area that may be damaged by overflow from a restricted main drain pan. (ICP FEM4X60000b2 Fan Coil installation instructions, Page 4)

Once again, because of the location chosen there is no available route to run the required separate drain.

Secondary Overflow Safety Switch

Since the secondary overflow safety switch is at the top surface of the safety switch, the overflow pan has to fill very close to the top edge before the switch senses the water and shuts off the HVAC unit. Testing showed that over 5.25 gallons of water had to be added to the overflow pan before the HVAC unit would be shut off. The secondary overflow safety switch should be rotated 180 degrees to put the sensor at the bottom thereby shutting the unit down almost immediately.

HVAC Sub-Contractor 2015-03-16 Response to Homeowner

The secondary drain pan is equipped with a secondary overflow safety switch which disables the unit if there is a condensation clog or frozen evaporator coil situation eliminating any further damage to the unit or structure if secondary drain overflowing goes unnoticed. Not only is this code compliant and the new norm but it is a much better alternative. Condensate drains will work fine as they were installed and you do not put a trap on the secondary.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

The installation manual doesn't list any exceptions for the separate drain for the auxiliary drain pan. The secondary overflow safety switch is connected via small gauge copper wire. I guess copper wire never gets damaged or brittle and breaks causing the secondary overflow safety switch to fail. Building to code is building to the lowest quality level allowed.



HVAC 5 ton Split System - Incorrect Condensate Drain Traps

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Status: Contractor Refused to Correct

Description

Condensate drain traps of required size and shape were not used. The primary condensate drain uses a trap made from 3 PVC elbows, and the secondary drain has none. Quoting the installation instructions:

- To prevent property damage and achieve optimum drainage performance, **BOTH** primary and secondary drain lines should be installed and include properly sized condensate traps (refer to Figure 18)

- **CAUTION! PRODUCT or PROPERTY DAMAGE HAZARD**

- Failure to follow this caution may result in product or property damage. **Use only full size P-traps in the condensate line (refer to Figure 18). Shallow, running traps are inadequate and DO NOT allow proper condensate drainage** (refer to Figure 19). (ICP FEM4X60000b2 Fan Coil installation instructions, Page 14)

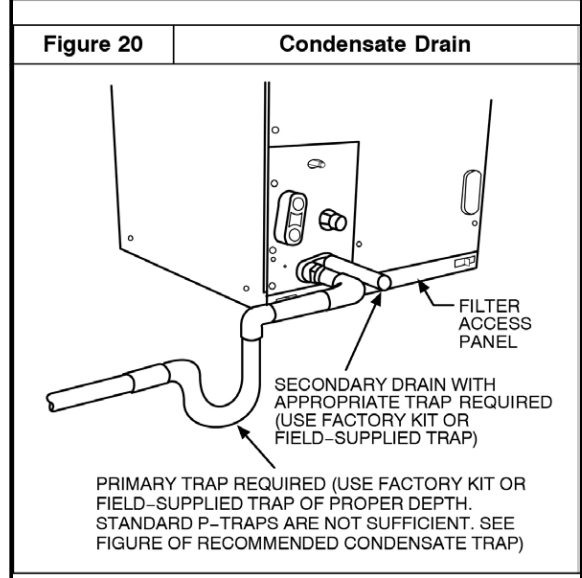
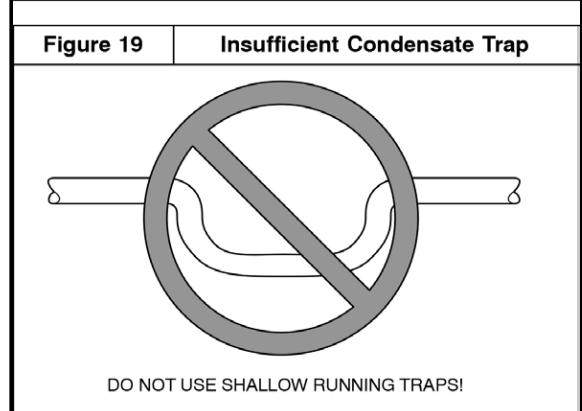
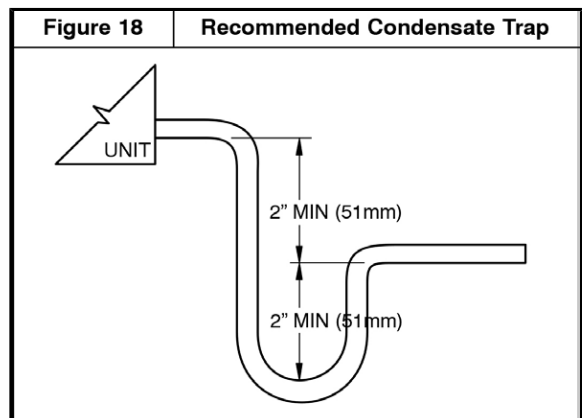
HVAC Sub-Contractor 2015-03-16 Response to Homeowner

Condensate drains will work fine as they were installed and you do not put a trap on the secondary.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

The HVAC contractor seems to know better than the equipment manufacturer and mechanical engineers that design the HVAC equipment he installs.





HVAC 5 ton Split System - Undersized Access Panel Opening

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Status: Pending

Description

When installing an air handler above a ceiling building code requires an access panel large enough to remove the air handler from the interior space without disassembling the building's interior wall structure. The access opening provided by contractor is 29" long x 21.125" wide and is not square. The air handler modular sections are 22"x 21", which will not fit through a 21" opening without damaging the interior ceiling. At a minimum another 1" needs to be added to the opening width.

Contractor 2015--- Response to Homeowner

Homeowner 2015--- Response to Contractor

HVAC 5 ton Split System - Damaged Air-handler Overflow Pan

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Description

Air-handler overflow pan side was buckled. Good possibility overflow would not have triggered shutoff switch.



HVAC 2 ton Packaged System - Noisy and Not Heating

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Status: Contractor Refused to Correct

[Ideal Energy Inspection Summary](#)

[Ideal Energy Inspection Report](#)

Description

During the summer cooling periods the 2 ton package unit is very loud during startup and unfortunately located exactly where we did not want it, above a bedroom. During winter cold periods the unit is still noisy and doesn't heat well, sometimes not at all. This past winter temperature measurements were taken at the return grille and at a room supply register. Even after 30 minutes the air temperature was actually lower by 1 to 2 degrees at the supply register than the return register. The 5 ton system was checked as well and it increased the supply register air out flow temperature over the return air inflow by 15 to 20 degrees, almost immediately.

HVAC Sub-Contractor 2015-03-16 Response to Homeowner

The 2 ton unit was installed in the only location possible to allow the owner to eliminate all drops. Again the drops were not put in the original house for aesthetics they were to allow for duct work.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

Other viable options existed, but the contractor refused the homeowner an opportunity to participate in the decision preventing any consideration of alternatives.

HVAC 2 ton Packaged System - Back to Back Room Supply Registers

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Status: Contractor Refused to Correct

Description

The east bedrooms supply registers are 'back to back' supply registers, meaning 2 room supply registers are aligned on the same duct. In this case the result is a 14" x 6" hole in the wall between the rooms. The obvious result is any noise in one room can be heard in the other. This is the result of a poorly designed system and is not acceptable.



HVAC Sub-Contractor 2015-03-16 Response to Homeowner

This was not optimal but due to space restrictions was necessary.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

Not optimal is hardly the appropriate description. Between two of the three east bedrooms every spoken word and noise can be heard in the other bedroom and in the third bedroom humdily and noise from the bathroom is a disturbance. Contractor's refusal to involve the homeowner and consider other viable alternatives is the only reason this duct location was necessary.

HVAC System - Incorrect Roof Installation

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Status: Contractor Refused to Correct

[ICP PHD424000KTP0D1 Package Heat Pump Specifications](#)

[Arizona's Roof Consultant Inspection Report](#)

Description

HVAC roof units were not installed correctly per industry nor manufacturers standards.

- The 2 ton packaged system unit is not secured correctly.
- The 5 ton split system compressor unit does not have protection for the underlying foam from vibration or other mechanical stresses.
- The 2 ton packaged system mounting curb is too short which does not meet industry or manufacturers' standards.
- The 2 ton package system is mounted with airflow directly into the house from the bottom of the unit. Not installing an elbow duct or a properly sized mounting curb causes excessive noise and vibrations to enter the bedrooms below.
- **Does not meet pre-loss** condition as well. Previous units were mounted with elbow ducts and mounting curbs of the correct height.

Arizona Roof Consultant Inspection Report:

- The foam roofing is open at the base of the down draft duct work.
- The unit is not secured or sealed correctly.
- There are no slip sheets installed under the wood sleepers to protect the coating surface.
- A/C unit needs to have a support frame a minimum of 8" above the deck. IRC workmanship standards

HVAC Sub-Contractor 2015-03-16 Response to Homeowner

I would defy you to find any unit in a 10 mile radius that is anchored to the roof for high winds. It is just not a matter of concern here and not a normal practice. Redwood placed directly on the foam roof is standard here and only if the roofing contractor requires is there a barrier strip installed which is provided by the roofing contractor. The 8" tall curb on the 2 ton is factory provided and standard. 14" taller curbs are generally on commercial applications and make the unit more visual from the ground necessitating screen walls.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

Refer to:



- Arizona Roof Consultant Inspection Report, Pages 2, 7
- ICP PHD424000KTP0D1 Package Heat Pump Specifications, page 18

HVAC System - No Provision for Indoor Air Quality

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Status: Contractor Refused to Correct

Description

No provision was made for maintaining healthy indoor air quality now that the building envelope limits fresh air inflows. ASHRAE 62.2-2013 specifies a mechanical ventilation rate of 100 cfm per hour is required for a living space of 2300 Sq Ft

HVAC Sub-Contractor 2015-03-16 Response to Homeowner

ASHRAE 62.2 was not part of the original home HVAC and as such not part of the pre-loss condition.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

The new HVAC system was never intended to restore the home to an identical pre-loss condition. Examples of the homeowner not wanting to restore to pre-loss conditions are: all replaced doors and windows are energy star qualified, a new structural awning was constructed over a west facing window, and windows were resized and moved for energy efficiency. There never was a mandate from the homeowner to return the home to the identical pre-loss condition and this point would have been restated and the IQA issue raised if the homeowner had been consulted properly by the contractor.

HVAC System - Remedy

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Status: Contractor Refused to Correct

Description

Both the 5 ton split system and 2 ton package system should to be replaced with a roof mounted package unit correctly sized for the living space cooling load. The 5 ton system is fatally flawed due to its location, capacity, and installation problems that cannot be corrected.

The 2 ton unit is defective, causes excessive noise in the bedrooms, and its capacity is unnecessary.

The existing roof mounted chase/duct system should be expanded to serve the entire living space, abandoning the current flawed between joist ducting approach. The above changes will reflect the original request and more closely match the USAA structure estimates. It will also avoid the problems caused by the design of the current system.

Almost all of these changes can be accomplished exterior to the living space, from the flat roof area. The cost is minimized working from the roof because the foam installation has already been found to be inadequate and needs additional coatings applied.

HVAC Sub-Contractor 2015-03-16 Response to Homeowner

In summary in order to install an HVAC system as described in this report there would have had to been several structural changes to the existing house requiring an Architect and Mechanical Engineer to redesign the structure to allow for all ducting, larger return grills, transfer air pathways and Manual J calculations. You cannot go back and spec out things after the fact.

Homeowner 2015-03-20 Response to HVAC Sub-Contractor

Of course this is complete nonsense, hyperbole, and a self serving attempt to distract from the issues. I have received specific dollar quotes from other HVAC contractors to do exactly what I recommended to the general contractor and in the above paragraphs as a remedy for 35% to 50% of what the general contractor charged the insurance company, and with higher quality HVAC equipment.

Additionally to claim that "structural changes" are needed before Manual J calculation can be performed is also ridiculous since I had one done for this report and it can also be done from building plans.

Roof - Eliminate Ponding Water

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Status: Contractor Refused to Correct

[Arizona Roof Consultant Inspection Report](#)

Description

Roof Inspection Report Recommendations: Ponding Water

1. The ponding areas of the roof need work. ROC workmanship standards need to be followed.



Roof - Additional Elastomeric Coating Required

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Status: Contractor Refused to Correct

[Arizona Roof Consultant Inspection Report](#)

Description

Roof Inspection Report Recommendation: Additional Elastomeric Coating Required

1. An additional 10 to 15 mils of coating must be applied to be brought up to NRCA standard of 30 mils.



Roof - Install Slip Sheets

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Status: Contractor Refused to Correct

[Arizona Roof Consultant Inspection Report](#)

Description

**Roof Inspection Report Recommendation:
Install Slip Sheets**

1. Slip sheets need to be installed



Roof - Install Counter flashings

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Status: Contractor Refused to Correct

[Arizona Roof Consultant Inspection Report](#)

Description

Roof Inspection Report Recommendation: Reinstall Counter flashings

1. Counter flashings need to be installed between the roof and the wood siding. IRC workmanship standards



Roof - Correct gable end closures

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Status: Contractor Refused to Correct

[Arizona Roof Consultant Inspection Report](#)

Description

Roof Inspection Report Recommendation: Correct gable end closures

1. Gable end closures need to be done in accordance with IRC workmanship standards



Roof - Replace A/C support frame

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Status: Contractor Refused to Correct

[Arizona Roof Consultant Inspection Report](#)

Description

Roof Inspection Report Recommendation: Replace A/C support frame

1. A/C unit needs to have a support frame a minimum of 8" above the deck. IRC workmanship standards



Roof - Remove and reinstall mansard ridge

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Status: Contractor solution rejected

[Arizona Roof Consultant Inspection Report](#)

Description

Roof Inspection Report Recommendation: Remove and reinstall mansard ridge

1. Remove and reinstall mansard ridge tiles according to TRI concrete tile installation manual

Homeowner 2015-03-20 Response to Contractor

Contractor offered to reinstall ridge tiles, but the new tile color would be different from existing tile and for some unexplained reason contractor would not fix all ridge tiles. Solution was rejected.



Roof - Replace the built up membrane

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Status: Contractor Refused to Correct

[Arizona Roof Consultant Inspection Report](#)

Description

Roof Inspection Report Recommendation: Replace

1. Replace the built up membrane and install it according to NRCA and WSRCA installation guidelines



Family Room Fireplace

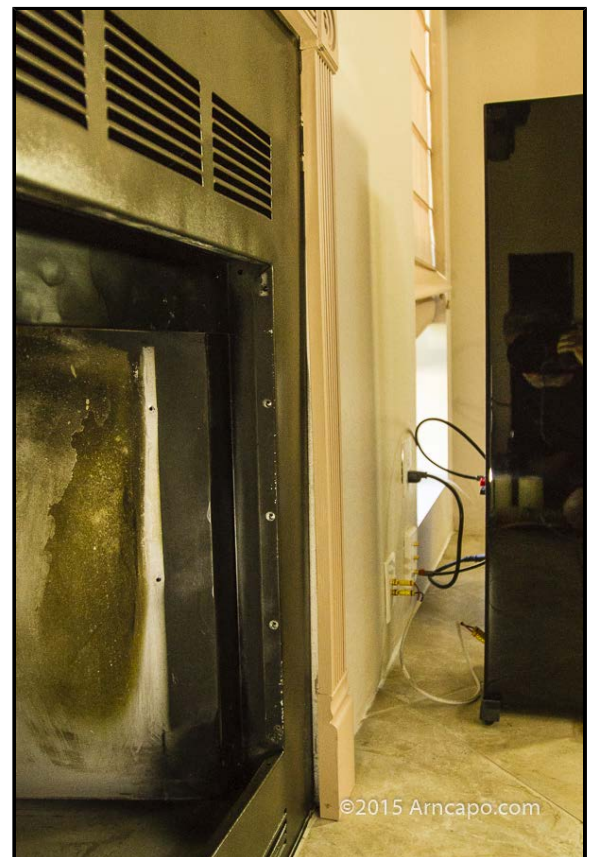
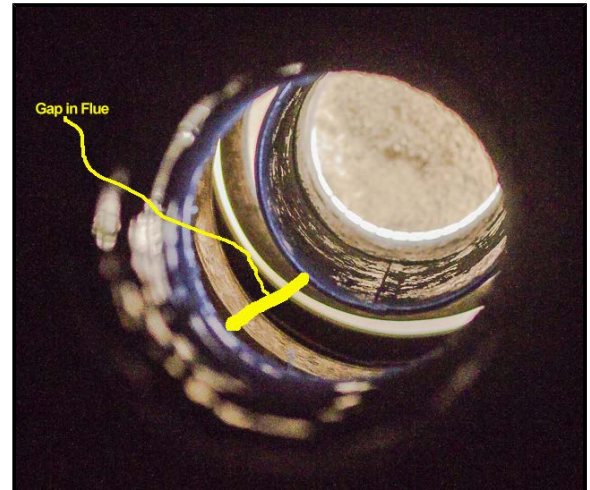
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Status: Inspection Scheduled

Description

The contractor was paid to lower the family room fireplace firebox to floor level, about 14in. This resulted in a 14in gap in the flue duct and a gap in the flue heat-shield duct. The flue and heat-shield gaps were not repaired by the contractor. Because the structure around the flue is wood 2x4s, wood roof joists, sawdust, construction debris, and insulation, use of the fireplace would almost certainly start the home on fire. Tempe building department has indicated that once it is installed correctly, an inspection is required.

The front of the fireplace was not installed plumb, a vertical deviation of 0.5" over the 36" height of the fireplace firebox front. This makes adding trim very difficult and unsightly.





Electrical

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Status: Inspection Scheduled

Description

Exterior electrical boxes have been falling out of the wall when unplugging a cord. The failure occurs on the first use indicating an inadequate installation.

The north east exterior flood light is not working.

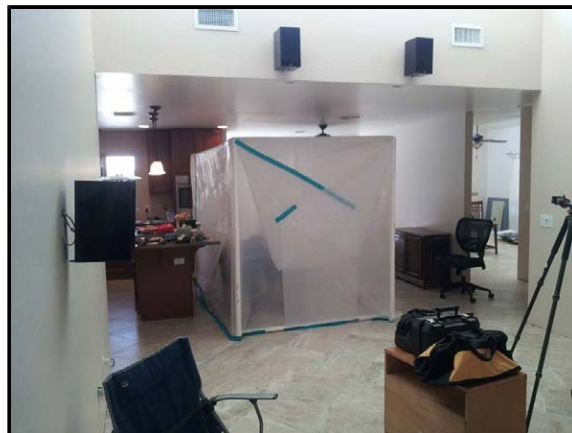


Laundry Sewer Drain Not Reconnected

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Status: Repair Complete

Description



Hall Bathroom

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Status: Contractor Refused to Correct

Description

The hall bathroom vanity hot and cold water valves are reversed from what is standard (hot on the left and cold on the right). The site photos show the original plumbing hot and cold valves were correct. The photo to the right shows all new copper pipe to the stub out for the toilet running to the stub out for what should be the hot water stub out. This can be repaired from the family room side eliminating the need to remove the vanity. To date the contractor has refused to repair this workmanship defect.



References

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[ACCA Friction Rate Reference Chart.pdf](#)
[ADC Flexible Duct Performance and Installation Standards.pdf](#)
[ADC Greenbook 4th Edition.pdf](#)
[ACCA HVAC Quality Installation Protocols.pdf](#)
[ACCA Existing Home Evaluation and Performance Improvement.pdf](#)
[ACCA Manual J Outdoor Design Conditions 508.pdf](#)
[ACCA Maintenance of Residential HVAC Systems.pdf](#)
[ACCA Manual D.pdf](#)

R2. International Comfort Products

[ICP FEM4X60000b2 Fan Coil installation instructions.pdf](#)
[ICP FEM4X60000b2 Fan Coil specifications.pdf](#)
[ICP FEM4X60000b2 Fan Coil warranty certificate.pdf](#)
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[ICP PHD424000KTP0D1 Package Heat Pump Specifications.pdf](#)

R6. Forms

[Arizona Registrar of Contractors Complaint Form.pdf](#)

R4. Inspection Reports

[Arizona's Roof Consultant Inspection Report.pdf](#)
[Ideal Energy Inspection Report.pdf](#)
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R3. Industry and Governmental Documentation

[Airflow is Critical.pdf](#)
[Joint Committee on Energy and Environmental Policy 2014-11-24 TN-74055.pdf](#)

R5. Contractor Responses

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[National Comfort Institute - Measure and Interpret Static Pressures.pdf](#)

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[ADC Greenbook 4th Edition.pdf](#)