



WILLCOX INSPECTIONS LLC™

Real Inspections. Sound Information.™
1431 Wirt Road #163 Houston, Texas 77055
713-461-0009

PROPERTY INSPECTION REPORT

Prepared For: Bee and Mike Stewart
(Name of Client)

Concerning: 1214 Pioneer Richmond, Texas 77406
(Address or Other Identification of Inspected Property)

By: Fred Willcox Professional Inspector #160 August 2, 2019
(Name and License Number of Inspector) (Date)

File No. 22810 7143-461-0009 www.willcoxinspections.com

PURPOSE, LIMITATIONS AND INSPECTOR / CLIENT RESPONSIBILITIES

This property inspection report may include an inspection agreement (contract), addenda, and other information related to property conditions. If any item or comment is unclear, you should ask the inspector to clarify the findings. It is important that you carefully read ALL of this information.

This inspection is subject to the rules (“Rules”) of the Texas Real Estate Commission (“TREC”), which can be found at www.trec.texas.gov.

The TREC Standards of Practice (Sections 535.227-535.233 of the Rules) are the minimum standards for inspections by TREC-licensed inspectors. An inspection addresses only those components and conditions that are present, visible, and accessible at the time of the inspection. While there may be other parts, components or systems present, only those items specifically noted as being inspected were inspected. The inspector is NOT required to turn on decommissioned equipment, systems, utility services or apply an open flame or light a pilot to operate any appliance. The inspector is NOT required to climb over obstacles, move furnishings or stored items. The inspection report may address issues that are code-based or may refer to a particular code; however, this is NOT a code compliance inspection and does NOT verify compliance with manufacturer’s installation instructions. The inspection does NOT imply insurability or warrantability of the structure or its components. Although some safety issues may be addressed in this report, this inspection is NOT a safety/code inspection, and the inspector is NOT required to identify all potential hazards.

In this report, the inspector shall indicate, by checking the appropriate boxes on the form, whether each item was inspected, not inspected, not present or deficient and explain the findings in the corresponding section in the body of the report form. The inspector must check the Deficient (D) box if a condition exists that adversely and materially affects the performance of a system or component or constitutes a hazard to life, limb or property as specified by the TREC Standards of Practice. General deficiencies include inoperability, material distress, water penetration, damage, deterioration, missing components, and unsuitable installation. Comments may be provided by the inspector whether or not an item is deemed deficient. The inspector is not required to prioritize or emphasize the importance of one deficiency over another.

Some items reported may be considered life-safety upgrades to the property. For more information, refer to Texas Real Estate Consumer Notice Concerning Recognized Hazards or Deficiencies below.

THIS PROPERTY INSPECTION IS NOT A TECHNICALLY EXHAUSTIVE INSPECTION OF THE STRUCTURE, SYSTEMS OR COMPONENTS. The inspection may not reveal all deficiencies. A real estate inspection helps to reduce some of the risk involved in purchasing a home, but it cannot eliminate these risks,

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nor can the inspection anticipate future events or changes in performance due to changes in use or occupancy. It is recommended that you obtain as much information as is available about this property, including any seller's disclosures, previous inspection reports, engineering reports, building/remodeling permits, and reports performed for or by relocation companies, municipal inspection departments, lenders, insurers, and appraisers. You should also attempt to determine whether repairs, renovation, remodeling, additions, or other such activities have taken place at this property. It is not the inspector's responsibility to confirm that information obtained from these sources is complete or accurate or that this inspection is consistent with the opinions expressed in previous or future reports.

ITEMS IDENTIFIED IN THE REPORT DO NOT OBLIGATE ANY PARTY TO MAKE REPAIRS OR TAKE OTHER ACTIONS, NOR IS THE PURCHASER REQUIRED TO REQUEST THAT THE SELLER TAKE ANY ACTION. When a deficiency is reported, it is the client's responsibility to obtain further evaluations and/or cost estimates from qualified service professionals. Any such follow-up should take place prior to the expiration of any time limitations such as option periods. Evaluations by qualified tradesmen may lead to the discovery of additional deficiencies which may involve additional repair costs. Failure to address deficiencies or comments noted in this report may lead to further damage of the structure or systems and add to the original repair costs. The inspector is not required to provide follow-up services to verify that proper repairs have been made.

Property conditions change with time and use. For example, mechanical devices can fail at any time, plumbing gaskets and seals may crack if the appliance or plumbing fixture is not used often, roof leaks can occur at any time regardless of the apparent condition of the roof, and the performance of the structure and the systems may change due to changes in use or occupancy, effects of weather, etc. These changes or repairs made to the structure after the inspection may render information contained herein obsolete or invalid. This report is provided for the specific benefit of the client named above and is based on observations at the time of the inspection. If you did not hire the inspector yourself, reliance on this report may provide incomplete or outdated information. Repairs, professional opinions or additional inspection reports may affect the meaning of the information in this report. It is recommended that you hire a licensed inspector to perform an inspection to meet your specific needs and to provide you with current information concerning this property.

TEXAS REAL ESTATE CONSUMER NOTICE CONCERNING HAZARDS OR DEFICIENCIES

Each year, Texans sustain property damage and are injured by accidents in the home. While some accidents may not be avoidable, many other accidents, injuries, and deaths may be avoided through the identification and repair of certain hazardous conditions. Examples of such hazards include:

- malfunctioning, improperly installed, or missing ground fault circuit protection (GFCI) devices for electrical receptacles in garages, bathrooms, kitchens, and exterior areas;
- malfunctioning arc fault protection (AFCI) devices;
- ordinary glass in locations where modern construction techniques call for safety glass;
- malfunctioning or lack of fire safety features such as smoke alarms, fire-rated doors in certain locations, and functional emergency escape and rescue openings in bedrooms;
- malfunctioning carbon monoxide alarms;
- excessive spacing between balusters on stairways and porches;
- improperly installed appliances;
- improperly installed or defective safety devices;
- lack of electrical bonding and grounding; and
- lack of bonding on gas pipes, including corrugated stainless steel tubing (CSST).

To ensure that consumers are informed of hazards such as these, the Texas Real Estate Commission (TREC) has adopted Standards of Practice requiring licensed inspectors to report these conditions as "Deficient" when performing an inspection for a buyer or seller, if they can be reasonably determined.

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These conditions may not have violated building codes or common practices at the time of the construction of the home, or they may have been “grandfathered” because they were present prior to the adoption of codes prohibiting such conditions. While the TREC Standards of Practice do not require inspectors to perform a code compliance inspection, TREC considers the potential for injury or property loss from the hazards addressed in the Standards of Practice to be significant enough to warrant this notice.

Contract forms developed by TREC for use by its real estate licensees also inform the buyer of the right to have the home inspected and can provide an option clause permitting the buyer to terminate the contract within a specified time. Neither the Standards of Practice nor the TREC contract forms require a seller to remedy conditions revealed by an inspection. The decision to correct a hazard or any deficiency identified in an inspection report is left to the parties to the contract for the sale or purchase of the home.

INFORMATION INCLUDED UNDER “ADDITIONAL INFORMATION PROVIDED BY INSPECTOR”, OR PROVIDED AS AN ATTACHMENT WITH THE STANDARD FORM, IS NOT REQUIRED BY THE COMMISSION AND MAY CONTAIN CONTRACTUAL TERMS BETWEEN THE INSPECTOR AND YOU, AS THE CLIENT. THE COMMISSION DOES NOT REGULATE CONTRACTUAL TERMS BETWEEN PARTIES. IF YOU DO NOT UNDERSTAND THE EFFECT OF ANY CONTRACTUAL TERM CONTAINED IN THIS SECTION OR ANY ATTACHMENTS, CONSULT AN ATTORNEY.

ADDITIONAL INFORMATION PROVIDED BY INSPECTOR

STRUCTURAL INSPECTION

PURPOSE: The purpose of a structural inspection is to perform a visual inspection, in a limited period of time, of the structural components of the building and to express an opinion as to whether, in the sole opinion of the inspector, they are performing without the obvious need of immediate repair or restoration. The main objective of the inspection and of this report is to better appraise you, our client, of the conditions existing at the time of the inspection. The inspection and this report are focused exclusively on the identification of **SIGNIFICANT** defects. There should be no expectation on your part that all defects, existing or potential, were discovered during the inspection. There may be items listed in this report as “deficient” that may have been considered acceptable when originally installed or constructed, but due to changes in the industry may not be considered acceptable due to obsolescence, or life, safety, health or functionality considerations. Older houses are evaluated for performance according to the building codes and manufacturer’s installation instructions in existence at the time the house was constructed and are not inspected by current building codes, standards or manufacturer’s installation instructions. If additional defects, deficiencies and/or hazards are not discovered during the repair, adjustment or replacement of the items noted in this report you should be concerned about the quality and effectiveness of the repairs that were allegedly made on the house, its parts, components or systems. We cannot and do not represent or warrant that the structure, or any of its parts or components, will continue to perform satisfactorily in a manner that will be acceptable to you or that they will continue to perform the function in the manner found at the time of the inspection. We do not represent or warrant that the future life of any item will extend beyond the time of this inspection. It is the intention and purpose of the inspection and of this report to **INFORM YOU EXCLUSIVELY** of the observations and opinions of the inspector, made on the day and at the time of the inspection, as to the condition and performance of the structure inspected. Use of this report by third parties is unauthorized and unintended. Opinions of the inspector are subjective based on his education and experience and should not be considered conclusive.

THIS INSPECTION AND REPORT WERE PREPARED FOR YOUR EXCLUSIVE USE. USE OF THIS REPORT BY, OR LIABILITY TO THIRD PARTIES, PRESENT OR FUTURE OWNERS AND SUBSEQUENT BUYERS IS SPECIFICALLY EXCLUDED. RELIANCE ON THIS REPORT BY THIRD PARTIES, PRESENT OR FUTURE OWNERS AND SUBSEQUENT OWNERS IS AT THEIR PERIL. NO

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WARRANTIES OR GUARANTIES TO THIRD PARTIES, PRESENT OWNERS OR FUTURE OWNERS ARE IMPLIED OR SHOULD BE ASSUMED.

You have three days from the date of this inspection to review and accept this report. If you are not satisfied with this inspection and this report, you may return the report, sign a release stating that you will not use any information conveyed to you during the inspection or from this report, engage the services of another Professional Inspector licensed by the Texas Real Estate Commission and, upon receipt of the release and agreement to the obligations stated above, obtain a full refund of the fee you paid for this inspection and report. Recovery for any claim arising from this inspection for whatever cause is strictly limited to the total amount of the fee paid to the inspector or this company by you, our client. Acceptance of this report or the use of any part or component of this report confirms your acceptance of all the conditions contained in this report.

Bee and Mike Stewart agrees to indemnify, defend, and hold harmless Fred Willcox and/or Willcox Inspections in any action brought against Fred Willcox and/or Willcox Inspections with respect to any and all claims, demands, causes of action, debts or liabilities, including reasonable attorney’s fees arising out of or relating to this agreement or property inspection, whether or not resulting from the negligence of any party so indemnified, unless the cause is proved to be gross negligent action or intentional misconduct of the inspector.

In any dispute, controversy, or lawsuit arising from this agreement, the prevailing party shall be entitled to recover from the unsuccessful party, reasonable and necessary attorney’s fees incurred in connection with such dispute, controversy, or lawsuit. This agreement is entered into in Harris County, Texas and shall be construed and interpreted in accordance with the laws of the State of Texas. Venue for any action brought to enforce this agreement shall lie in Harris County, Texas. Any dispute arising from this agreement, inspection or report shall be resolved solely by a judge in a court of competent jurisdiction.

Possession of this report does not carry with it the right of publication. This inspection report may not be used for any purpose or by any person other than the party to whom it is addressed without the written consent of the inspector. None of the contents of this inspection report, parts or components of this report or a copy of this report shall be conveyed to the public through any means, purpose or venue without the written consent and approval of the inspector.

Estimates for repair, if included, are provided as a courtesy and should be considered approximate. These estimates should not be viewed as bids for the actual performance of the work or of the repair suggested. It is recommended that you confirm the actual need for repair, the scope of the work, and the approximate cost with a qualified, appropriate service company. A PRUDENT BUYER WILL SECURE FIRM ESTIMATES FROM A QUALIFIED REPAIR COMPANY BEFORE CLOSING.

SCOPE: This inspection is limited to observations of only those components of the structure and those portions of the roof framing and surface readily accessible and visible without moving or the removal of any item or object that would obstruct visual observation. The comment of “inspected” noted by any section of this report means that, at a minimum, all parts and components of that section listed in the Minimum Standards of Inspections as published by the Texas Real Estate Commission were inspected. The rules of the Texas Real Estate Commission (TREC) can be found at www.trec.state.tx.us. These standards are treated as minimums and they do not limit the ability of the inspector to inspect or comment on the property as the inspector deems appropriate. The inspector is not a registered professional engineer and a visual inspection does not contain engineering methods or computations. According to Webster’s Dictionary, “engineering” is “the application of science and mathematics by which the properties of matter and the sources of energy in nature are made useful to people; the design and manufacture of complex products.” No such “engineering” activities occurred during this visual inspection. Any item not capable of being seen at the time of the inspection, that is concealed by objects, vegetation or the finishes of the structure is specifically excluded as

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being beyond the scope of this inspection. Conditions not readily and visually apparent at the time of the inspection were not considered in reaching the conclusions or rendering the opinions contained in this report.

Specifically excluded from the inspection and this report are:

- 1) boring, digging or probing the soil or structure
- 2) location or effects of geological faults or of any underground structure or object
- 3) location of gas lines and/or systems
- 4) presence of asbestos and/or radon gas
- 5) CSST (Corrugated Stainless-Steel Tubing) gas pipes and bonding of CSST
- 6) lead based paint and/or products made from or containing lead
- 7) adequacy of site drainage, ground water infiltration or historical flooding
- 8) opinions relating to compliance with any specifications, legal and/or code requirements or restrictions of any kind, and
- 9) determination of the presence or health effects of molds, mildew, etc.

The following items are beyond the scope of this inspection and will not be inspected unless otherwise specifically stated in this report: Underground items (such as utilities), gas lines, fuel quality, environmental items (such as fuel tanks), telephone systems, television and/ or satellite systems, elevators, central vacuum systems, detached structures, bulkheads / docks and piers, fences / yard enclosures, intercoms, sound systems, security and fire and/or smoke detection systems, fire sprinkler systems, water-conditioning equipment, drain or waste ejector pumps, water mains, sewer systems, water wells / springs, lawn sprinkler systems, swimming pools, spas, hot tubs, saunas, steam baths, fountains, waterfront structures and equipment, solar systems, outdoor cooking equipment, free-standing appliances, playground equipment, or personal property.

NOTE: No environmental inspections of any kind were performed during this inspection. Even if comments are made regarding certain aspects or issues, inspections and/or any determination of the presence or possible dangers of materials organisms or microbial organisms including, but not limited to Chinese drywall, asbestos, lead, formaldehyde, mildew, molds, fungi, etc. are specifically excluded from the inspection and from this report. No intrusive tests or methods damaging to sound materials were employed. No indoor air quality test was performed. If you have any concerns over the presence or possible future growth of any of these type items, you should, as part of your due diligence, have the environmental inspections of your choice performed on the house prior to closing.

Items not specifically noted as “inspected” in the following report are not cover by the report and should not be assumed to be good, bad, performing without the obvious need of repair or restoration by the lack of notation. This report is focused exclusively on the identification of significant defects. No verbal statements by the inspector are to be considered a part of the inspection or of this report. It is again emphasized that this is a limited visual inspection made in a limited amount of time. Some defects may not be apparent during the time of the inspection. This is not intended to be an exhaustive evaluation of the structure, nor is it intended to be a total list of defects, existing or potential. The inspection and this report must not be considered a guarantee, warranty or policy of insurance or of continuation of performance of any kind. Excluded from the inspection and from this report are warranties or guarantees of future performance or certification that any or all items are in compliance with legal and/or code requirements, any manufacturer’s specifications or installation instructions, municipal ordinances, neighborhood deed restrictions or that any system or component is of the correct capacity. Unless specifically noted in this report, the inspection and this report do not address product safety recalls. No inspection or anticipation is made, or advice given regarding the need for continuing or future maintenance of the structure or grounds. The inspector does not take care, custody or control of the structure at any time. If the house is occupied at the time of the inspection, it is possible that visible defects may have been concealed or covered by furniture, fixtures, appliances and/or clothing, etc. Once the owner/occupant vacates the property, any visible defect that becomes apparent should be reported to you via an updated seller’s disclosure form. The photographs included in this report are intended to be used to illustrate some, but not all, of the defects and to clarify the text information in the

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report. All photographs taken at the subject property may not be included in the report. The photographs are not intended to be all inclusive or to describe all conditions noted on the property.

This report was prepared on a computer. Infrequently, a word or part of a sentence may be accidentally deleted or altered during editing. Should you encounter such a condition or any other sentence structure irregularity, please contact me as soon as possible. The necessary corrections will be made and you will be provided with a corrected report. In addition, you are urged to contact me for an explanation and/or clarification of any items in the report that you do not understand.

MECHANICAL REPORT

This limited visual inspection was performed, for the exclusive use of the client, with the intent of observing and reporting deficiencies apparent at the time of the inspection without disassembly of any unit or item inspected. This inspection was made of the physical condition of electrical switches, cover plates and convenience outlets that were accessible without moving furniture or fixtures. All functional equipment, in operable condition, was operated in at least one, but not necessarily every, mode to demonstrate its condition. Compliance with codes and/or adequacy of wiring and circuitry is beyond the scope of this inspection and report and is specifically excluded. If more in-depth information is desired or required on the electrical system or systems, it is recommended that a qualified electrician be consulted. It is emphasized that this is a limited visual inspection made in a limited amount of time. Some defects may not be apparent during the time of the inspection. This inspection is not intended to be an exhaustive evaluation of all the systems and appliances in the structure, nor is it intended to be a total list of defects, existing or potential. Items marked as "inspected" mean that, at a minimum, all parts and components of that section or item listed in the Minimum Standards of Inspections as published by the Texas Real Estate Commission were inspected. Items not noted as "inspected" in the following report are not covered by the report and should not be assumed to be good, bad, performing the function for which they were intended or in need of repair by lack of notation. No verbal statements by the inspector are to be considered a part of the inspection or of this report. Unless specifically noted in this report, the inspection and this report do not address product safety recalls.

INSPECTIONS OF GAS LINES AND/OR SYSTEMS OR FOR THE PRESENCE OF ASBESTOS, LEAD PAINT, "CHINESE" OR TAINTED DRYWALL, PRODUCTS CONTAINING LEAD, RADON GAS OR OTHER ENVIRONMENTAL HAZARDS, INCLUDING MOLDS, MILDEWS OR FUNGI, ARE SPECIFICALLY EXCLUDED.

Additional pages may be attached to this report. Read all pages of this inspection report very carefully. This report may not be complete without the attachments. If an item is present in the property but is not inspected, the "NI" column will be checked and an explanation is necessary. The inspector may provide comments whether or not an item is deemed in need of repair.

REFERENCES TO THE BUILDING CODES ARE IN ITALICS AND UNDERLINED TEXT AND ARE USED SOLELY FOR CLARIFICATION OF THE ITEM NOTED. THE QUOTATIONS FROM THE BUILDING CODE ARE FROM THE INTERNATIONAL BUILDING CODE PUBLISHED BY AND COURTESY OF THE INTERNATIONAL CODE COUNCIL, INC. UNLESS OTHERWISE NOTED. IT SHOULD BE UNDERSTOOD THAT OLDER HOMES WILL NOT MEET CURRENT CODES AND THAT THESE HOUSES WERE NOT CONSTRUCTED TO ANTICIPATE FUTURE CODES, REQUIREMENTS OR THE CREATION OF NEW LIFE/SAFETY DEVICES OR EQUIPMENT. NOTATIONS OF CURRENT CODE REQUIREMENTS AND OF MODERN LIFE/SAFETY EQUIPMENT ARE MADE TO ADVISE YOU THAT THESE CONDITONS, APPLIANCES AND DEVICES EXIST AND THAT YOU MAY WISH TO UPGRADE THE HOUSE TO A LEVEL OF SAFETY THAT SATISFIES YOU.

HOW TO READ THIS REPORT

Promulgated by the Texas Real Estate Commission (TREC), P.O. Box 12188, Austin, Texas 78711-2188, 1-800-250-8732 or (512) 459-6544 (<http://www.trec.state.tx.us>)

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DEFICIENCIES: These are items that are not functioning properly, were improperly installed, and are considered to be unsafe or items that are functionally obsolescent. If you understand the comment in bold you do not need to read the information section that follows.

INFORMATION: The information section explains the deficiency noted in the part, component or system. This information is provided to give you a clearer understanding of the defect noted.

REFERENCES: References are the materials I use to provide the basis of calling out a deficiency. Reference materials are from the model building codes, manufacturer's installation instructions or from trade association manuals. The model building codes require that the minimum standards of the building code or the manufacturer's installation instructions, whichever is more restrictive, be used on every part, component and system in the structure. If the seller or the builder wishes to dispute an item in this report, the seller or builder should provide you with the source material they are relying on to refute the statement in this report. Common building practices or the "everybody does it" defense is not recognized as compliance with any model building code or manufacturer's installation instruction.

NOTE OR NOTICE: Information provided on things that you should know about the structure or a part component or system. Notes or Notices are not indications of a defect or deficiency.

PHOTOGRAPHS: Photographs are used to show you an example of the deficiency noted in the report. The photographs DO NOT show all defects or locations of the noted deficiency in most cases. If you opted against having photographs included in your inspection report, I still took photograph of the house and the photographs are retained with the field notes of your inspection.

I. STRUCTURAL SYSTEMS

The subject structure was a two story, single family dwelling supported on what appeared to be a concrete slab-on-grade foundation. The exterior cladding systems were brick veneer and wood siding. The main roof was covered with composition shingles. There was a low sloped roof over the front entry that was not accessible. The house was not occupied at the time of the inspection. For the purposes of this report the house will be considered to be facing south. The weather was partly cloudy at the time of the inspection. The outside temperature was measured to be 85 degrees Fahrenheit and the relative humidity was measured to be 74% at the beginning of the inspection.



NOTICE: According to the available information this house was constructed in 1985. The tax records available online show the original construction in 1985 but do not show the addition(s) or alterations to the house. The tax records available online still show the house at approximately 2700 square feet. Construction requirements and practices in use at the time of construction of the house as well as the actual performance were considered in rendering the opinions expressed in this report except where required by the minimum Standards of Practice of the Texas Real Estate Commission. Building code references are used to assist you in understanding performance issues.

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A. Foundations

Type of Foundation(s): appeared to be a concrete slab on grade
Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Information: The foundation appeared to be performing without the obvious need of immediate remedial leveling at the time of the inspection, in my opinion.

Notice: Cracks were noted on the surfaces of the slab in the garage, etc.

Information: Cracks in concrete do not, in and of themselves, indicate a structure deficiency in the construction or performance of a foundation. The interior surfaces of the foundation of the house were concealed by floor covering materials and could not be inspected. This information is provided so that you are aware that I knew the cracks were present when I rendered my opinion on the performance of the foundation at the time of the inspection.

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B. Grading & Drainage

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Deficiency: The soils surrounding the foundation were in contact with or were too close to the exterior veneers in some areas.



Information: The minimum standard of clearance from the surface of the ground level to the bottom of masonry veneer is 4 inches. The minimum standard of clearance from the surface of the ground to the bottom of wood veneer is 6 inches. The minimum allowable slope for drainage requires that the soils and flower beds around the house slope and minimum of 6 inches in the first ten feet away from the house. The grading of the lot should be corrected to insure proper drainage.

Reference: 401.3 Drainage.

Surface drainage shall be diverted to a storm sewer conveyance or other approved point of collection so as to not create a hazard. Lots shall be graded so as to drain surface water away from foundation walls. The

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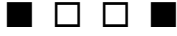
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grade away from foundation walls shall fall a minimum of 6 inches (152 mm) within the first 10 feet (3048 mm).



C. Roof Covering Materials

Type(s) of Roof Covering: composition shingles on the high sloped roof, unknown on the low sloped roof

Viewed From: the ground with binoculars

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

NOTE: The surface of a roof begins to deteriorate as soon as it is placed into service and exposed to the elements. The degree of deterioration accelerates with the age of the roof and cannot be determined accurately by a visual inspection. Roof leaks can and may occur at any time, regardless of the age of the roof, and cannot be accurately predicted. If roof leaks do occur, their presence does not necessarily indicate the need for total replacement of the roof coverings. Responsibility for future performance of the roof is specifically excluded from this report.

NOTICE: The surface of the roof was not accessible to this inspector and was viewed from the ground with binoculars. An inspection of the roof covering materials from ground level is not an effective inspection. A competent roofer with the equipment capable of safely reaching and staying on the roof should be engaged to perform a proper inspection of the surface of the roof covering materials prior to the expiration of any contractual time limitations on due diligence inspections or investigations.

Deficiency: One of the type B vent terminations appeared to have inadequate clearance above the roof deck.



Information: The current requirement is that the termination is at least two feet above any part of the roof deck within ten feet of the vent pipe termination. The requirement is made ensure proper drafting of the vents. The termination of the vent pipes should be raised for safety. See Table in Figure G2427.5.3 from the International Building Code below.

References: G2427.5.3 Chimney termination.

G2427.5.3 (503.5.4) Chimney termination. Chimneys for residential-type or low-heat appliances shall extend at least 3 feet (914 mm) above the highest point where they pass through a roof of a building and at least 2 feet (610 mm) higher than any portion of a building within a horizontal distance of 10 feet (3048 mm) (see

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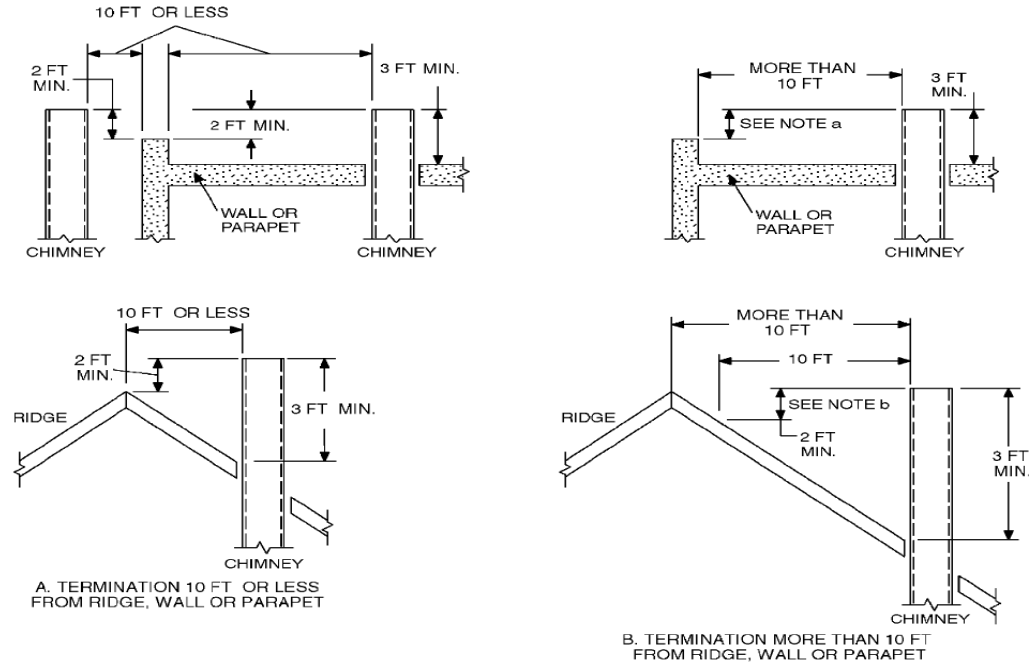
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Figure G2427.5.3). Chimneys for medium-heat appliances shall extend at least 10 feet (3048 mm) higher than any portion of any building within 25 feet (7620 mm). Chimneys shall extend at least 5 feet (1524 mm) above the highest connected appliance draft hood outlet or flue collar. Decorative shrouds shall not be installed at the termination of factory-built chimneys except where such shrouds are listed and labeled for use with the specific factory-built chimney system and are installed in accordance with the manufacturer's installation instructions.



Deficiency: The dish assembly bracket for the satellite antenna system had been bolted to the roof deck through the shingles.



Information: There was no attempt to make the junction of the bracket with the shingles or the penetrations of the bolts through the shingles waterproof. The bracket junction and the bolt penetrations should be made waterproof or the dish should be removed from the surface of the roof. If the dish is removed, the damaged shingles should be replaced.

Deficiency: Skylights were installed through the roof.

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Information: Skylights will ultimately leak. Skylights do not have adequate clearance above the surface of the roof to allow water to be diverted away from the skylight. As water collects against the skylight, the water will ultimately reach a depth that it will overcome any flashing system. It is only a question of the amount of rain that falls in a given period of time that determines when a skylight will leak.

Deficiency: Tree limbs were in contact with the roof's surface.



Information: Tree limbs scraping across the roof covering materials can cause damage. The limbs should be trimmed to avoid damage to the roof covering materials.

Deficiency: The gutters appeared to be inadequately sloped to the downspouts.

Information: The gutters should be properly sloped to drain completely. It is required by most manufacturers that the gutters slope a minimum of 1 inch for every 15 foot run of gutter.



D. Roof Structure & Attic

Viewed From: the Interior of the Attic

Approximate Average Depth of Insulation: unable to determine

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

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Walkways in the attic were limited to the areas of the HVAC equipment and the water heater. Much of the attic area could not be safely accessed. The areas of the attic without walkways were not inspected except by the use of a flashlight. Information.

Deficiency: The pony walls in the attic were not tied back to the ceiling joists and framing to prevent the pony walls from rotating.



Information: Pony walls are walls that are not full height that extend above the ceiling joists. The top of the pony wall must be tied back to the framing to overcome the turning moment produced by the horizontal component of the loads produced by the rafters.

References: *Section 802.3.1 of the IRC Ceiling joist and rafter connections.*

Ceiling joists and rafters shall be nailed to each other in accordance with Tables R602.3(1) and R802.5.1(9), and the assembly shall be nailed to the top wall plate in accordance with Table R602.3(1). Ceiling joists shall be continuous or securely joined where they meet over interior partitions and nailed to adjacent rafters to provide a continuous tie across the building when such joists are parallel to the rafters.

Where ceiling joists are not connected to the rafters at the top wall plate, joists connected higher in the attic shall be installed as rafter ties, or rafter ties shall be installed to provide a continuous tie.

Deficiency: There were “lay down” valley rafters used to support some of the valley rafters of the addition.



I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

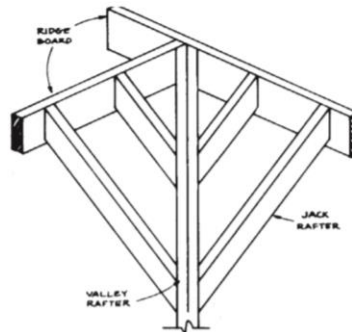
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Information: A lay down rafter is improper for several reasons. The use of the lumber under this type framing is thought to be considerably weaker than the use of a valley rafter as the board is laid on its wide side and resists bending on its narrow side. The stiffness of a structural member is primarily determined by its depth, not its width. Section R802.3 of the International Residential Code (IRC) requires that all valley rafters be constructed as beams. Second, a common rafter cannot be used to support another common rafter, which is what happens with this type valley. Third, the system is structurally indeterminate. The forces cannot be resolved or their magnitude evaluated. Properly constructed valley rafters should be installed.

Reference: *American Wood Council and R802.3 Framing details.*

Rafters shall be framed to ridge board or to each other with a gusset plate as a tie. Ridge board shall be at least 1-inch (25 mm) nominal thickness and not less in depth than the cut end of the rafter. At all valleys and hips there shall be a valley or hip rafter not less than 2-inch (51 mm) nominal thickness and not less in depth than the cut end of the rafter. Hip and valley rafters shall be supported at the ridge by a brace to a bearing partition or be designed to carry and distribute the specific load at that point.

Figure 55. Valley Rafter Roof Framing



Deficiency: Some of the addition valleys of the roof were improperly created. These valley rafters rested on the original garage roof deck.



Information: The jack rafters of the additions were supported on the roof decking. Common rafters can only support the weight of the roof covering materials and are not allowed to support other structural members. Valleys are required to be created by attaching the jack rafters to a single board. In addition, the type of construction used on this house makes it impossible to determine the load carrying capabilities of the structural frame. As there were no visible deflections or indications of stress at the improperly created valleys there is no need for immediate repair of the valleys.

I=Inspected

NI=Not Inspected

NP=Not Present

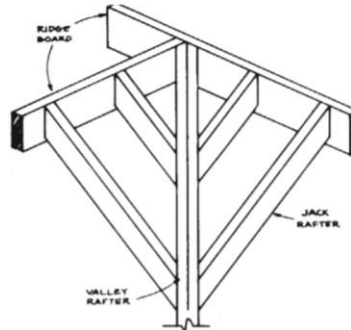
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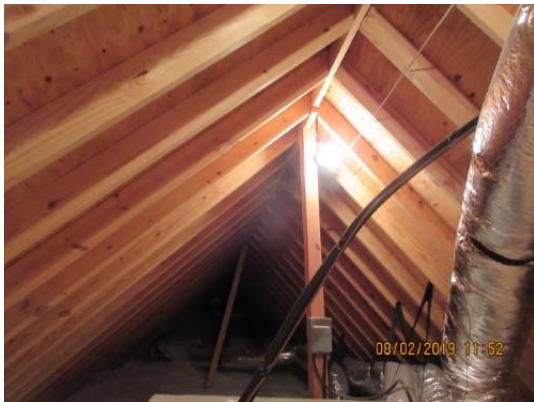
Reference: *American Wood Council and R802.3 Framing details.*

*Rafters shall be framed to ridge board or to each other with a gusset plate as a tie. Ridge board shall be at least 1-inch (25 mm) nominal thickness and not less in depth than the cut end of the rafter. **At all valleys and hips there shall be a valley or hip rafter not less than 2-inch (51 mm) nominal thickness and not less in depth than the cut end of the rafter.** Hip and valley rafters shall be supported at the ridge by a brace to a bearing partition or be designed to carry and distribute the specific load at that point.*

Figure 55. Valley Rafter Roof Framing



Deficiency: There were an inadequate number of collar ties attached to the rafters of the addition.



Information: Collar ties are horizontal pieces of lumber used to attach rafters to each other under the ridge board, forming an “A”, if you will. Collar ties are high wind load members. When wind passes over the ridge of a roof, it becomes turbulent and can form a vacuum. This vacuum will attempt to pull the roof framing apart at the ridge. Collar ties are used to prevent this separation. Collar ties should be installed on approximately four-foot centers.

Reference: *R802.3.1 Ceiling joist and rafter connections and Details for Conventional Wood Frame Construction by the American Wood Council.*

Collar ties or ridge straps to resist wind uplift shall be connected in the upper third of the attic space in accordance with Table R602.3(1). Collar ties shall be a minimum of 1-inch by 4-inch (25 mm by 102 mm) (nominal), spaced not more than 4 feet (1219 mm) on center.

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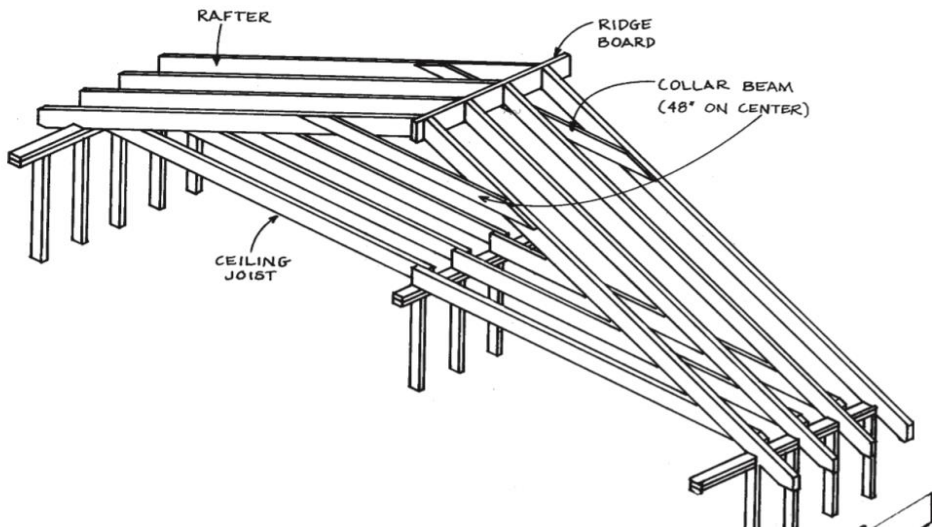
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Figure 51. Roof Framing Ceiling Joists Parallel to Rafters



Notice: Safety precautions should be taken to prevent child access to the attic area(s) and/or to any other unfinished area of the house or garage.

Information: Access openings to the attic areas or any unfinished areas should be made inaccessible by the use of locks that are not operable by a child and/or by latches that are not accessible to and that cannot be operated by a child. Such locking devices should be installed before the child learns to crawl and, preferably, before you occupy the house.

Deficiency: Insulation depths varied from a couple of inches to mounds of insulating materials.



Information: The depth of the insulating materials should be uniform for proper performance. The depth of the insulating materials determines their resistance to heat transfer. Varying depths of insulating materials means uneven resistance to heat transfer.

Deficiency: The attic was inadequately ventilated in my opinion.

Information: Additional ventilation should be installed in my opinion. Perfect ventilation of the attic would mean that the attic would be the same temperature and relative humidity as the outside atmosphere. The

I=Inspected

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outside atmosphere in our area is hot and humid. The common temperature range of the high 90' s to low 100' s and relative humidity levels in excess of 90% are not a good environment for mechanical equipment, building frame components or insulating materials. So, the best an attic can be ventilated in this region is not a good atmosphere. Anything less than the outside atmosphere is worse than bad.

Deficiency: There was no continuous handrail on the attic staircase.



Information: A continuous handrail is required for safety on any stairs more than 4 risers in height.

References: *311.5.6.2 Continuity.*

Handrails for stairways shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above lowest riser of the flight. Handrail ends shall be returned or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than 1 1/2 inch (38 mm) between the wall and the handrails.

Deficiency: There was no guardrail on the open side of the attic staircase.

Information: A guardrail is required to prevent the user of the staircase from falling.

Reference: *R312.1 Guards.*

Porches, balconies, ramps or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 36 inches (914 mm) in height. Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads.

Deficiency: The areas between the treads on the attic staircase were open.

Information: While it is permissible to have these type openings, the openings must be filled so that an object 4 inches in diameter cannot fit through any open area. This is to prevent a child from falling through the open areas. The open areas should be properly obstructed.

References: *R311.5.3.3 Profile.*

..... Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.

I=Inspected

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Deficiency: There was no landing on the lower end of the attic staircase.

Information: Section R312.2 of the International Residential Code requires a minimum length of a landing to be 36 inches in the direction of travel. The user of the stairs would have to bend down to open the doors while standing on the staircase. This can cause the user of the staircase to fall.

References: 311.5.4 Landings for stairways.

There shall be a floor or landing at the top and bottom of each stairway.

Exception: A floor or landing is not required at the top of an interior flight of stairs, provided a door does not swing over the stairs.

A flight of stairs shall not have a vertical rise greater than 12 feet (3658 mm) between floor levels or landings.

The width of each landing shall not be less than the stairway served. Every landing shall have a minimum dimension of 36 inches (914 mm) measured in the direction of travel.

■ □ □ ■ E. Walls (Interior & Exterior)

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Deficiency: Water penetration was noted on the interior of the window frames and sills in the living room and dining room, etc.



Information: The sources of the water penetration should be determined and repaired. The presence of water penetration may indicate the growth of microbial organic organisms that may be toxic. Indoor air quality tests are not a part of this inspection. Should you desire an indoor air quality test, the test should be arranged prior to closing. Once the sources of the water penetration have been determined and repaired, all decayed, deteriorated or damaged materials, including walls covering materials, trim, moldings, insulating materials and framing members should be removed and replaced and finished to match the existing structure.

Deficiency: Deteriorated wood was found on the interior window frames in the living room and dining room, and on the exterior siding, trim and fascia, etc.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Information: The presence of deteriorated or decayed wood indicates the need for an examination by a qualified licensed pest control inspector. Presence or damage from termites, rot or other wood infesting organisms is not part of this report. Detection of wood infesting organisms is reserved by Texas Law to a person licensed to perform wood destroying insect inspection. Where deterioration was found on the interior of the house, it is strongly recommended that the wall covering materials be removed and the structural

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NP=Not Present

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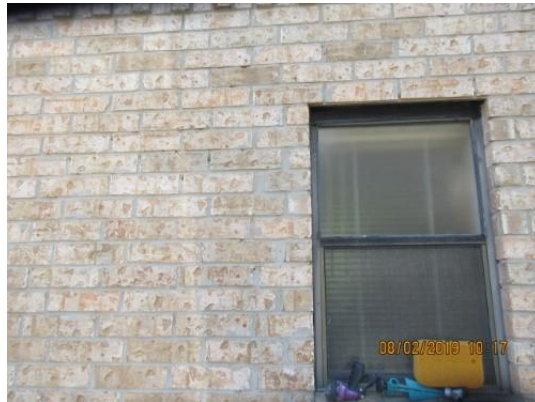
framing materials be inspected for the presence of deteriorated members. All deteriorated material, regardless of the cause, should be removed and replaced with sound new lumber finished to match the existing structure. The presence of deteriorated wood and water penetration indicates the possibility of the presence of microbial organic organisms, which may include toxic molds or fungi. The indoor air quality should be tested to determine if a hazard exists.

Deficiency: There were minor cracks in the brick veneer.



Information: The cracks should be repointed by a skilled mason to match the existing structure.

NOTICE: The brick veneer had been repointed on the east and west sides of the house. The reason(s) for the repointing of the bricks should be obtained from the current owners.



I=Inspected

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D= Deficiency

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Deficiency: The junctions of the window frames and door frames with the brick veneer were not properly sealed (caulked).



Information: The lack of a proper seal can allow water into the wall cavity and can allow a more ready transfer of air from the exterior of the house to the interior of the house. All of the wall openings should be properly sealed with an approved adhesive to reduce the possibility of water penetration, to restrict the access of pests and insects to the interior of the house and to limit the transference of air from the interior of the house to the exterior atmosphere.

Deficiency: All penetrations through the wood or wood fiber products cladding materials had not been sealed, flashed or drained.

I=Inspected

NI=Not Inspected

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D= Deficiency

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Information: Any and all penetrations are required to be sealed and/or flashed in such a manner as to prevent water penetration through the cladding materials. All wall penetrations should be properly flashed and sealed.

References: *R703.7.5 Flashing, R703.7.6 Weepholes, and R703.8 Flashing and examples from James Hardie, Inc.*

R703.7.5 Flashing.

Flashing shall be located beneath the first course of masonry above finished ground level above the foundation wall or slab and at other points of support, including structural floors, shelf angles and lintels when masonry veneers are designed in accordance with Section R703.7. See Section R703.8 for additional requirements.

Flashing is necessary to close off the points of water entry at the first course of masonry above the finished ground level, as well as at other points of support such as at shelf angles and lintels. As always, flashing must be of an approved corrosion-resistant material. From the Commentary to the IRC.

R703.8 Flashing.

Approved corrosion-resistant flashing shall be applied shingle-fashion in such a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. **The flashing shall extend to the surface of the exterior wall finish.** Approved corrosion-resistant flashings shall be installed at all of the following locations:

I=Inspected

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D= Deficiency

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1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

The code requires that all points subject to the entry of moisture be appropriately flashed. Roof and wall intersections and parapets create significant challenges, as do exterior wall openings exposed to the weather. Where wind-driven rain is expected, the concerns are even greater. *Although the code identifies a number of locations where flashing is specifically required, the entire exterior envelope must be weather-tight to protect the interior from weather. Therefore, any location on the exterior envelope that provides a route for the admission of water or moisture into the building must be properly protected.* Commentary Figure R703.8 illustrates examples of flashing. From the Commentary to the IRC.

HOSE BIBS

Hose bibs are a source of water which increases the likelihood of moisture related problems. The goal is to keep the water outside of the building and the best way to do this is keep the water off the walls. A good preventative measure is to extend the hose bib further from the wall. A downward slope on the water pipe as it leaves the building will also encourage any slow leaks to fall away from the home.

Large piping over 1 1/2" diameter is required to have blocking and flashing at the penetration. A block of HardieTrim® 5/4, 4/4 boards should be installed around the point of penetration. To install a block around an existing pipe, it may be necessary to cut the block into two pieces. In this case, weather-cut the trim to fit it into place. Install flashing over the top of the trim block.

LIGHTS AND ELECTRICAL OUTLETS

Lights and Electrical boxes should have the same flashing and blocking as other large penetrations such as vents. Many lights utilize square electrical boxes. Blocking a square object should still incorporate the best practices of an angled weather cut.

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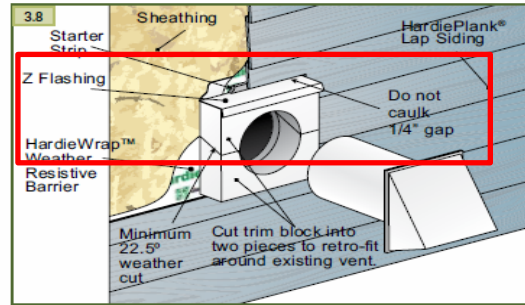
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PENETRATIONS

For penetrations in the building envelope such as hose bibs and holes 1 1/2" diameter or larger, such as dryer vents, a block of HardieTrim® 5/4, 4/4 boards should be installed around the point of penetration. To install a block around an existing vent pipe, it may be necessary to cut the block into two pieces. In this case, weather-cut the trim to fit it into place. Install flashing over the top of the trim block.

Penetrations through a building envelope are made to accommodate needs such as hose bibs, dryer and furnace vents, electrical conduit, etc. It is important to restore the weather-resistant barrier of the home after cutting a hole for the penetration.

There are several pre-made blocking and flashing products available that can simplify the installation of a penetration. One such example is SturdiMount®. Be sure to follow all manufactures installation instructions.



SturdiMount

Deficiency: The garage door header sagged.



Information: This indicates that the header was not adequate to properly transfer the structural loads to the columns of the garage door frame. The header should be replaced with a header adequate to properly transfer the structural loads.

Deficiency: Siding and trim components had been damaged by rodents.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Information: The damaged cladding materials should be replaced. The new siding components should be painted to match the existing structure.

■ □ □ ■ **F. Ceilings & Floors**

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Deficiency: There appeared to be patches in the drywall coverings of the walls and ceilings throughout the structure.



Information: The causes of the patches could not be determined. Information on the patches should be obtained from the current owner.

Deficiency: Floor slopes apparently created by a construction error or by deflection(s) in the were noted in the second story middle bedroom, etc. There was a “high area” in the floor.

Information: It is a basic engineering and construction principal that floors shall be constructed “level” and that walls shall be constructed “plumb”. Loads can be transferred without the creation of turning moments when walls are plumb and floors are level. When floors are not level and walls are not plumb turning moments are created that allow the frame to move. This results in cracks in wall covering materials, out of square door frames and the slopes in the floors that many people associate with a defective or failed foundation.

I=Inspected

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The slopes appeared to be related to the structural framing. Defects in the framing could include anything from location of beams or headers, improper design and/or installation, excessive spacing or spanning of the joists, improper boring or notching of joists or beams, failure to reinforce the structure for the loads imposed by mechanical equipment in the attic, use of inadequate materials, etc. As the framing was concealed by finish materials, it was not possible to determine what, if any, defects were present in the framing. In order to determine the exact cause(s) of the floor slopes, the floor framing system would have to be exposed.

There is some confusion in the building and inspecting professions concerning deflections in floor framing systems. The model building codes and the span tables issued by lumber grading agencies allow deflections in floor framing that do not exceed the ratio of one part vertical deflection in a three hundred and sixty part span. The span is the horizontal distance between supports. This ratio is equated to a one inch vertical displacement in a 360 inch span. Since 360 inches is the same as 30 feet, the ratio is often stated as a one inch deflection in a 30 foot span. As this is a ratio, it could also be stated as a one-half inch deflection in a fifteen foot span or a one-quarter inch deflection in a seven and one-half foot span. *The ratio is used as deflections in excess of 1 part vertical deflection in a 360 part span causes cracks in wall covering materials. Per the model building code, the formation of cracks from deflections in the floor framing system is a structural defect.*

The deflection is the amount of deformation allowed after the floor framing system is fully loaded. The floor framing system is designed to support its own load and live loads of varying amount depending on the intended use of the roof. If the loads of a bedroom are considered, the floor framing system would be designed to carry the weight of the lumber used to create the floor frame and the floor covering materials. The floor framing system would also be designed to support loads from furniture and furnishings up to a total load of 30 pound per square foot.

If we consider the loads that the bedroom floor framing system would be designed to support, assume that the bedroom is sized 10 feet by 15 feet. The square footage of the floor would be 10 feet multiplied by 15 feet which equals 150 square feet. To obtain the total, reasonable well distributed load imposed by furniture and furnishings that the floor framing system is designed to carry without exceeding the allowed deflection ratio of 1/360, multiple 150 square feet by 30 pounds per square foot which equals 4,500 pounds.

The floor framing system is, therefore, designed to carry its own weight plus 4,500 pounds, reasonably well distributed across the surface of the floor, without exceeding the allowable deflection expressed by the ratio of one part vertical displacement over a 360 part span.

Should a floor framing system deform in excess of that ratio without having the loads imposed on the floor framing system exceed the designed minimum load for that type room, the floor framing system is deficient.

If the floor slopes are created during the construction of the house, this is indicative of poor construction practices, an inadequate design and/or the use of inadequate framing materials. Deformation of the floor framing system in excess of the allowable deformation under full design loading likely indicates a significant framing problem.

As the floor framing system of this house did not appear to have been overloaded, the presence of the excessive deformations of the floor framing systems indicates that the causes of the deformations should be determined and corrected. The floor framing system should be analyzed by a competent structural engineer who is not routinely hired or employed by the builder or owner of the house to remove any conflict of interest concerns.

G. Doors (Interior & Exterior)

Comments:

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Information. There were no visual defects in the doors or in their operation that appeared to require immediate repair at the time of the inspection, in my opinion.

■ □ □ ■ **H. Windows**

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Deficiency: Some of the windows were difficult to open, close and/or latch.

Information: The windows should be adjusted to open, close and latch properly. The bedroom windows are considered emergency escapes. If the windows are difficult to operate, the occupant of the room may not be able to escape during a fire or other emergency.

Deficiency: There were damaged glazing strips on some of the windows.



Information: The cracked and damaged glazing strips should be replaced were necessary.

■ □ □ □ **I. Stairways (Interior & Exterior)**

Comments:

Information: There were no visual defects in the main stairway that appeared to require immediate repair at the time of the inspection, in my opinion.

■ □ □ ■ **J. Fireplaces and Chimneys**

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Deficiency: Water penetration was noted in the flue and firebox.

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NP=Not Present

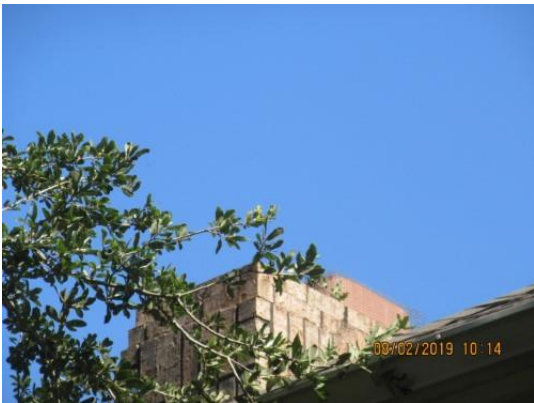
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Information: Water penetration damages the fire brick and can make the fireplace dangerous to use. The source of the water penetration should be determined and corrected. The damage to the brick and the safety of the brick should then be determined.

Deficiency: There was no spark arrestor cap on the chimney termination.



Information: A spark arrestor is primarily used for safety, but they also reduce or prevent rain water from entering the flue. Spark arrestors also prevent animal life, excluding insects, from entering the flue.

Deficiency: The chimney termination appeared to have inadequate clearance above the roof deck.



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Information: The current requirement is that the termination is at least two feet above any part of the roof deck within ten feet of the chimney. The requirement is made to reduce the chances of live sparks landing on the roof deck and to ensure proper drafting of the chimney. The termination of the chimney should be raised for safety.

References: 1001.6 Termination.

Chimneys shall extend at least 2 feet (610 mm) higher than any portion of a building within 10 feet (1048 mm), but shall not be less than 3 feet (914 mm) above the highest point where the chimney passes through the roof.

■ □ □ □

K. Porches, Balconies, Decks, and Carports

Comments:

Information. There were no visible structural defects noted in the existing porches or decks that indicated the need for immediate repair at the time of the inspection, in my opinion.

■ □ □ ■

L. Other

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

NOTICE: Sections of the driveway had been replaced. The reason(s) for the replacement of the driveway should be obtained from the current owners.



II. ELECTRICAL SYSTEMS

■ □ □ ■

A. Service Entrance and Panels

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Information: Electrical service was provided to the house by underground conductors. The conduit protecting the conductors was continuous and was not damaged, where visible. The meter was securely

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NP=Not Present

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attached to the structure. The grounding conductor was visible and appeared to be securely fastened to the grounding electrode.

Deficiency: There was only one grounding electrode visible on the property.

Information: Grounding requires the use of a grounding system. A second means of grounding should be installed in accordance with Sections E3507.6 and E3508 of the IRC. The IRC and the NEC require that a grounding system be installed. A grounding system, as defined by the electrical codes, means two direct grounding electrodes or a made electrode and a concrete encased electrode with access to the connection of the concrete encased electrode. Access to a concrete encased electrode or to a grounding ring does not have to be provided and may not be visible. The presence of a proper grounding electrode system should be verified or a proper grounding electrode system should be installed for safety.

References: E3507.6 Common grounding electrode.

The service grounding electrode in or at a building shall be used to ground conductor enclosures and equipment in or on that building. Two or more grounding electrodes that are effectively bonded together shall be considered as a single grounding electrode system.

This section requires that the grounding electrode used to ground the service neutral conductor must also be used to ground all the metallic enclosures in the electrical system. With one grounding electrode used to ground all of these components, there will not be a different potential; all enclosures will be at the same zero voltage potential as the grounded service conductor. Where two or more grounding electrodes are used at the premises, they must be effectively bonded together and considered as one grounding electrode. This keeps all non-current carrying metal surfaces in the electrical system at earth potential. From the Commentary to the IRC.

Deficiency: The exterior grounding electrode conductor was not protected against physical damage.

Information: The conductor must be protected so that it is not cut or damaged. Damage to the grounding conductor could result in the loss of the earth grounding of the electrical system.

Reference: E3610.2 Securing and protection against physical damage.

Where exposed, a grounding electrode conductor or its enclosure shall be securely fastened to the surface on which it is carried. A 4 AWG or larger conductor shall be protected where exposed to physical damage. A 6 AWG grounding conductor that is free from exposure to physical damage shall be permitted to be run along the surface of the building construction without metal covering or protection where it is and securely fastened to the construction; otherwise, it shall be in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, electrical metallic tubing or cable armor. Grounding electrode conductors smaller than 6 AWG shall be in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, electrical metallic tubing or cable armor.

Deficiency: The grounding electrode was not fully buried into the ground.

Information: The grounding rod is required to be buried its full length into the earth. The connection of the grounding electrode to the grounding conductor and the grounding conductor itself should be protected from physical damage.

References: E3608.1.4.1 Installation.

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The rod and pipe electrodes shall be installed such that at least 8 feet (2438 mm) of length is in contact with the soil. They shall be driven to a depth of not less than 8 feet (2438 mm) except that, where rock bottom is encountered, electrodes shall be driven at an oblique angle not to exceed 45 degrees (0.79 rad) from the vertical or shall be buried in a trench that is at least 30 inches (762 mm) deep. The upper end of the electrodes shall be flush with or below ground level except where the aboveground end and the grounding electrode conductor attachment are protected against physical damage.

Deficiency: An improper electrical clamp was used on the grounding electrode.



Information: The clamp was a pipe clamp not a clamp designed for electrical conductivity. Proper electrical clamps are in contact continuously around the electrode and the conductor. Proper clamps should be used to insure proper electrical current flow.

Deficiency: A grounding conductor was connected to an exterior faucet on the west side of the house.



Information: This conductor may serve as a bond on the copper water pipes but cannot be the service grounding system as defined by the National Electric Code. As the main water shut off valve was in the laundry room, the bonding conductor connection to the exterior faucet could not have been within five feet of where the water main pipe entered the structure. A second proper earth grounding made electrode should be installed for safety.

References: E3608.1.1 Metal underground water pipe.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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A metal underground water pipe that is in direct contact with the earth for 10 feet (3048 mm) or more, including any well casing effectively bonded to the pipe and that is electrically continuous, or made electrically continuous by bonding around insulating joints or insulating pipe to the points of connection of the grounding electrode conductor and the bonding conductors, shall be considered as a grounding electrode (see Section E3608.1). Interior metal water piping located more than 5 feet (1524 mm) from the entrance to the building shall not be used as part of the grounding electrode system or as a conductor to interconnect electrodes that are part of the grounding electrode system.

The code assumes that the first 5 feet (1524 mm) of water piping, measured from the point that the piping penetrates an outside wall or floor slab on grade, will not be disturbed or altered by plumbing work. Any piping beyond 5 feet (1524 mm) into the building is more likely to be altered such that electrical continuity is lost. This alteration could take the form of the installation of plastic piping, nonconductive components (e.g., water filters), dielectric fittings or the removal of grounding clamps. From the Commentary to the IRC.

Information: The main breaker panel was an interior 150 Amp ITE panel board with 150 Amp main disconnects. The service entrance conductors were 2/0 AWG aluminum conductors. The conductors to the circuits were copper. The circuits were labeled as follows:

- 1 __ 100-240 sub panel
- 1 __ 60-240
- 1 __ 40-240
- 2 __ 30-240
- 8 __ 20-120
- 9 __ 15-120



Information: The sub breaker panel was an interior 100 Amp Square D panel board with 100 Amp main disconnects. The service conductors were copper conductors. The conductors to the circuits were copper. The circuits were labeled as follows:

I=Inspected

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NP=Not Present

D= Deficiency

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- 1 __ 50-240 heat
- 1 __ 40-240 garage a/c
- 4 __ 30-240 a/c, water heater, a/c, garage
- 2 __ 20-240 a/c, a/c

- 2 __ 20-120
- 2 __ 15-120

Deficiency: The circuits were not properly labeled or identified in the breaker panel.

Information: As the circuits were not identified, it could not be determined if the circuits were properly sized for the listed appliances. Over sizing of overcurrent protective devices on any appliance is a recognized fire hazard. Undersizing of conductors is also a fire hazard. The National Electric Code, Section 408.4, states that identifying circuits as ‘bedrooms or wall outlets or light switches’ is not adequate. Labeling must be specific as to which appliances are to be protected by the over current device. The circuits should be rated and certified by a competent electrician according to the listings of the appliances.

References: E3606.2 Panelboard circuit identification.

All circuits and circuit modifications shall be legibly identified as to purpose or use on a circuit directory located on the face or inside the door of the enclosure.

The panelboard circuit directory must be permanent and legible. In many homes, the door of the panel board cabinet reveals illegible markings. The outlets a circuit serves are a mystery to an observer because the markings on the panelboard have become faded or are incomplete. Some electricians and installers write only such things as “lights” or “plugs” or “kitchen plugs” to satisfy this section. Each circuit identification must be detailed enough to distinguish the circuit from all other circuits. Obviously, 10 circuits labeled “lights and receptacles” cannot be distinguished from each other and such labels are a violation of this section. From the Commentary to the IRC.

Deficiency: The aluminum service entrance current carrying conductors had not been properly treated with an anti-oxidizing compound. The application was fraudulent and was intended to deceive. The electrician who did this should be reported to his licensing agency for discipline.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Information: The service entrance conductors between the meter and the breaker panel were aluminum conductors, as are almost all service conductors throughout this area. The conductors between the meter can and the transformer are also most likely aluminum. All aluminum terminals should be properly treated. The aluminum conductors should be cleaned and properly treated with an anti-oxidizing compound. Proper treatment with an anti-oxidizing compound means that the conductors were dipped in the mastic, not dabbed with mastic. Electricity tends to flow on the surface of a conductor and aluminum oxide is a worse conductor than aluminum. The presence of aluminum oxide increases the resistance of the conductor, which increases the heat in the conductor and forces an increase in electrical flow in order to maintain the electrical service, all of which increases electrical use and your cost for electricity. While the metals used for the connectors for the panel are compatible for use with aluminum wiring as far as thermal expansion is concerned, the possibility of galvanic action remains. The anti-oxidizing mastic should be replaced as it dissipates.

References: *E3306.8 Aluminum and copper connections.*

It is very important to use an approved oxide-inhibiting compound on aluminum conductors. Where aluminum conductors are subject to moisture or even very high humidity, oxidation can occur. Oxidation of aluminum can cause a thin film or layer, which looks like a powder, on the conductor. It will result in heat build-up by impeding the current flow. From the Commentary to the IRC.

Deficiency: The conductors in the panel were not properly color coded.



Information: Neutral (white insulated) conductors were used as hot conductors and were not identified as hot, or ungrounded, conductors. All hot (ungrounded) conductors are required to be identified by the use of any color other than white, gray or green or bare copper. The conductors should be properly identified for safety.

I=Inspected

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D= Deficiency

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References: E3307.3 Ungrounded conductors.

Insulation on the ungrounded conductors shall be a continuous color other than white, gray or green.

Deficiency: Multiple grounded (neutral) conductors were connected under one screw on the bus bars.



Information: The IRC (International Residential Code) and the National Electric Code provide that all current carrying conductors be connected to any and all electrical component by only one screw. As electricity travels on the surface of a conductor, poor contact at the connection points reduces the surface area of the contact point and can result in damage to the conductor. The grounded conductors should be separated so that only one conductor is connected to each port of the bus bars.

References: E3606.4 Grounded conductor termination & .E3306.9 Terminals.

Each grounded conductor shall terminate within the panelboard on an individual terminal that is not also used for another conductor, except that grounded conductors of circuits with parallel conductors shall be permitted to terminate on a single terminal where the terminal is identified for connection of more than one conductor.

Connection of conductors to terminal parts shall be made without damaging the conductors and shall be made by means of pressure connectors, including set-screw type, by means of splices to flexible leads, or for conductor sizes of No. 10 and smaller, by means of wire binding screws or studs and nuts having upturned lugs or the equivalent. Terminals for more than one conductor and terminals for connecting aluminum conductors shall be identified for the application.

Connections must be made without damaging the conductors. When stripping the insulation from the ends of conductors, it is easy to nick or cut into the wire. Using improper techniques or tools when stripping the conductors may damage the softer aluminum conductors. In many installations, two or more conductors are connected under one terminal since it is easy to install them and they will fit. However, terminals for connecting multiple conductors must be listed for this purpose. Most modern equipment such as panelboards has terminal strips with a sufficient number of terminals to connect all necessary circuit conductors. In some cases, it may be necessary to install additional terminal strips in order to terminate each conductor under a separate terminal. If the terminals are approved for the connection of more than one conductor, the approval will be stated in the listing information or supplied with the packaging of the equipment. (From the Commentary to the IRC).

Deficiency: The main panel and the sub panel were not properly bonded or grounded.

I=Inspected

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D= Deficiency

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Information: This condition can put electrical potential on the electrical equipment and/or the equipment grounding conductors which can result in an electrical shock or fire hazard. The neutrals and equipment grounding conductors must be completely separated, the neutrals must be solely attached to the neutral bus bars and neutral conductors, the equipment grounding conductors to the grounding bus bar and grounding electrode conductors and the grounding bus bar must be bonded to the sub panel housing. The main panel and sub panel should be bonded for safety.

References: *It is extremely important that no connection is made between the grounded conductors and the grounding conductors downstream of the main disconnect. Such a connection on the load side of the main disconnect could create a parallel path for fault-current and normal current. An exception to this rule is for the circuits to existing ranges and dryers. Another exception is where two or more buildings are supplied from a common service and an equipment grounding conductor is not run with the supply conductors to the other building. Section 3607.2 of the IRC Commentary*

The feeder neutral or grounded conductor of the supply must be insulated and is not bonded to the panelboard cabinet. It is kept separate from the grounding conductors and is not bonded to the separate building grounding electrode(s). The panelboard cabinet of the separate building has one terminal bus for the grounded conductors and another for the grounding conductors. The bonding screw supplied for the purpose of bonding the neutral terminal strip to the metal cabinet must not be installed, and this neutral terminal strip is insulated from the metal cabinet. The grounding electrode is connected to the equipment grounding terminal, which is bonded to the metal cabinet. If the neutral terminal bus and the equipment grounding conductor terminal bus were bonded together, the current intended to return via the neutral could also flow on the equipment grounding conductor. This is a fire and life safety hazard. From the IRC Commentary.

Deficiency: The conductors entering the panel boards were bundled.

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D= Deficiency

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Information: Section 312.5 (C) of the National Electric Code (NEC) provides that each cable shall be secured to the cabinet. The section prohibits the installation of several cables bunched together through a knockout or chase unless specific rules are followed under the exception. Bundling of the conductors eliminates air space and restricts the diffusion of heat. The conductors entering the panel board should be separated for safety.

References: *Section 312.5 (C) of the National Electric Code*

Where cable is used, each cable shall be secured to the cabinet, cutout box or meter socket enclosure.

The main rule of 312.5 (C) prohibits the installation of several cables bunched together and run through a knockout or chase nipple. Individual cable clamps or connectors are required to be used with only one cable per clamp or connector, unless the clamp or connector is identified for more than a single cable.

Deficiency: There were an inadequate number of arc-fault protected circuits installed in the panel.

Information: The requirement for the installation of arc-fault protective devices began with the requirement for the use of arc fault protected outlets in the bedrooms only. This requirement was introduced with the publication of the 1999 National Electric Code (NEC). Arc fault circuit protection is required by the National Electric Code in all areas listed in the reference below. Arc-fault devices monitor the electrical current wave. If the wave pattern changes, indicating a spark or fire, the arc-fault protective device turns the electricity off. This deprives the fire of fuel which, hopefully, extinguishes the fire. It is hoped that the deprivation of fuel will cause the fire to extinguish itself. This information is provided to advise you that these safety devices are available should you want them installed in your home.

Reference: *210.12 Arc-Fault Circuit-Interrupter Protection*

Arc-fault circuit-interrupter protection shall be provided as required in 210.12(A) (B), and (C). The arc-fault circuit interrupter shall be installed in a readily accessible location. (A) Dwelling Units. All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets or devices installed in dwelling unit kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, laundry areas, or similar rooms or areas shall be protected by any of the means described in 210.12(A) (1) through (6): (1)



B. Branch Circuits, Connected Devices, and Fixtures

Type of Wiring: Copper

Comments:

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Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Deficiency: High Ohms or electrical resistance, indicating inadequate bonding and grounding, were found on the range/range vent unit.

Information: The appliances were tested for indications of continuity, which indicates bonding and/or grounding. Bonding equalizes electrical potentials and reduces the chances of electrical shock, electrocution or a fire. Grounding connects the circuit and the appliance to the earth to create a direct path for fault current. The unit should be properly bonded and grounded for safety.

Deficiency: The electrical bonding system installed in the house did not appear to include all required components.

Information: All metal piping systems, including each section of the natural gas distribution pipes are required to be bonded to the breaker panel or grounding electrode to equalize the differing electrical potentials on all elements that are capable of carrying electricity. These systems also include the telecommunications systems, cable systems and satellite systems, etc. Without proper bonding, a person or a flammable item could be the medium through which the potentials are equalized, which could result in a shock, electrocution and/or fire. Proper bonding should be installed for safety.

References: E3609.6 Metal water piping bonding.

The metal water piping system shall be bonded to the service equipment enclosure, the grounded conductor at the service, the grounding electrode conductor where of sufficient size, or to the one or more grounding electrodes used. The bonding jumper shall be sized in accordance with Table E3603.4. The points of attachment of the bonding jumper(s) shall be accessible. [250.104(A) and 250.104(A)(1)]

❖ Because the interior metal water piping might become energized, it must be bonded to the grounding electrode system. Bonding metal piping systems together reduces the possibility of a voltage potential between them and the associated shock hazard. This is not the same requirement that the metal underground water pipe be used as a grounding electrode. If the water service is a metal pipe for 10 feet (3048 mm) underground and metal where it enters the house, it is used as the grounding electrode. In some dwellings, the water piping system changes to plastic inside the house, and much of the water supply piping is plastic; however, any piping that is metal must be bonded to one of the parts of the grounding electrode system listed in this section. If the entire piping system is metal, it may seem obvious that the grounding electrode conductor being run to the first 5 feet (1524 mm) of the point at which the water pipe enters the house would bond the entire water piping system. In many cases there is a dielectric union at the entry of the water piping system, and a jumper is required from the line side of the union to the downstream side of the water piping. It may be necessary to bond between the hot and cold water pipes because these could have nonconductive materials at the water heater. The bonding jumper must be at least the size of the grounding electrode conductor determined for the service from Table E3603.4. The pipe clamp or fitting used to attach the bonding jumper to the water piping system must be accessible. The water heater is a convenient place for this since the attachment point will always be accessible. Also, this may be the best place to bond between the hot and cold water piping, if that is necessary.

E3609.7 Bonding other metal piping. Where installed in or attached to a building or structure, metal piping systems, including gas piping, capable of becoming energized shall be bonded to the service equipment enclosure, the grounded conductor at the service, the grounding electrode conductor where of sufficient size, or to the one or more grounding electrodes used. The bonding conductor(s) or jumper(s) shall be sized in accordance with Table E3908.12 using the rating of the circuit capable of energizing the piping. The

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equipment grounding conductor for the circuit that is capable of energizing the piping shall be permitted to serve as the bonding means. The points of attachment of the bonding jumper(s) shall be accessible. [250.104(B)]

❖ *The above-ground metal gas piping upstream from equipment shutoff valves must be bonded because it could become energized. The rating of the circuit serving the gas appliance or equipment determines the size of the bonding jumper in accordance with Table E3908.12. Under this practice, the size of a bonding conductor for a gas pipe serving a furnace supplied with a 20 ampere circuit would be 12 AWG according to the table. A three-conductor nonmetallic sheathed cable with size 12-AWG conductors (12-2 with ground) that is to run to the furnace is adequate for bonding the metal gas pipe since the grounding conductor of the cable is bonded to the grounding electrode system. The gas piping is connected to the appliance by metal to-metal joints; therefore, the piping is bonded to the appliance and the appliance grounding conductor. The gas piping is considered to be bonded where connected to the equipment-grounding conductor for a circuit capable of energizing the piping. This is specifically stated in the 2008 edition of NFPA 70, Section 250.104(B). See Section G2411 of the code, which addresses the bonding of gas piping and corrugated stainless steel tubing (CSST) used for gas. The bonding requirements for CSST are unique and extend beyond the requirements in this section.*

Deficiency: The CSST (Corrugated Stainless Steel Tubing) flexible gas connectors to the gas fired appliances were not observed to be electrically grounded/bonded the full length of the gas line per the manufacturer.



Information: There has been litigation with CSST gas lines caused by fires/lightning. Even if properly bonded the manufacturer does not warrant that the material will perform if lightning strikes directly on or near a structure. Refer to the manufacturer installation instructions and any “Google” articles on CSST litigation and for news articles on CSST. All metal components must be properly bonded and grounded for safety. All CSST should be replaced with a different flexible gas pipe connector in my opinion.

Reference: Typical Manufacturer’s Installation Instructions

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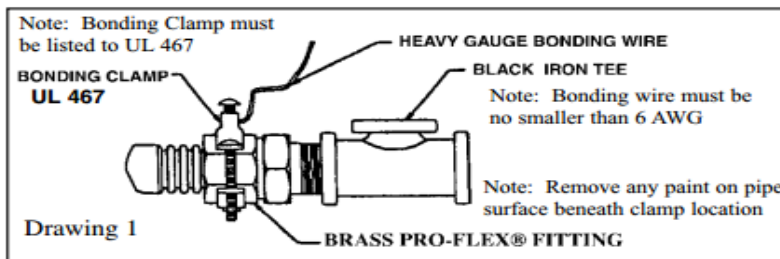
ELECTRICAL BONDING

In accordance with the NFPA 54 Section 7.13, Tru-Flex Metal Hose Corp., requires proper bonding of the Pro-Flex® gas-piping systems in a structure to the structure's electrical grounding system. This must be performed by a qualified person recognized by the local jurisdiction as capable of performing such work. These requirements are for all Pro-Flex® CSST installations.

Direct bonding of Pro-Flex® CSST is required as part of the installation of all new CSST natural and LP gas piping systems whether or not the connected gas equipment is electrically powered. This requirement is provided as part of the manufacturer's instructions for single-family and multi-family dwellings. Bonding for commercial applications should be designed by qualified persons knowledgeable in electrical system design and the local electrical code.

Pro-Flex® CSST installed inside or attached to the exterior of a building structure shall be electrically continuous and direct bonded to an effective ground-fault current path. The gas piping systems shall be considered to be direct bonded when installed in accordance with the following guidelines:

- A bonding jumper is permanently and directly connected to the electrical service grounding system. This can be achieved through a connection to the electrical service equipment enclosure, the grounded conductor at the electrical service, the grounding electrode conductor (where of sufficient size) or to the one or more grounding electrodes used.
- A single bond connection is made to the building gas piping downstream of the utility meter or second stage regulator (LP systems), but near the gas service entrance of the structure, or downstream of the gas meter of each individual housing unit within a multi-family structure. (A bonding connection shall not be made to the underground, natural gas utility service line or the underground supply line from a LP storage tank)
- The bonding conductor shall be no smaller than a 6 AWG copper wire or equivalent. Bonding/grounding clamps shall be attached in an approved manner in accordance with NEC and the listing of the clamp. Bonding /grounding clamps shall be listed to UL 467. The point of attachment for the bonding conductor shall be accessible. This bond is in addition to any other bonding requirements as specified by local codes.
- For attachment to the CSST gas piping system, a single bonding clamp must be attached to either a Pro-Flex® brass fitting, a steel manifold or to any rigid pipe between the meter and the first CSST fitting in the system. *The corrugated stainless steel tubing portion of the gas piping system shall not be used as the point of attachment of the bonding conductor at any location along its length under any circumstances. See drawings 1,2 and 3.*



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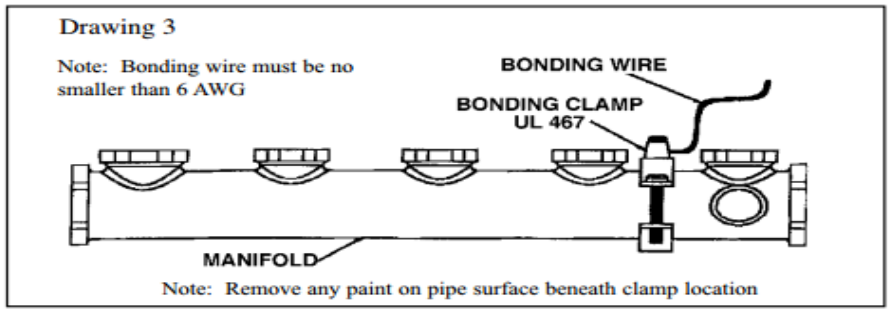
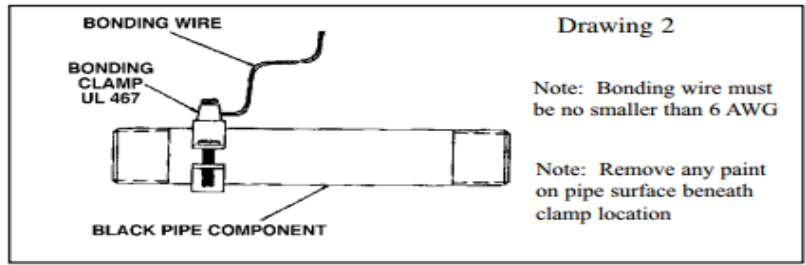
I=Inspected

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Proper bonding and grounding may reduce the risk of damage and fire from lightning strikes. Lightning is a highly destructive force. Even a nearby lightning strike that does not strike a structure directly can cause metallic systems (such as wiring, piping and ductwork) in the structure to become energized. If these systems are not properly bonded, the difference in potential between the systems may cause the charge to arc from one system to another and cause damage to the CSST. Bonding instructions set forth above should reduce the risk of arcing and its related damages.

Depending upon conditions specific to the location of the structure in which the Pro-Flex® system is being installed, including but not limited to whether the area is prone to lightning activity, the owner of the structure should consider whether a lightning protection system is necessary or appropriate. Lightning protection systems are beyond the scope of this manual, but are covered by NFPA 780, the Standard for the Installation of Lightning Protection Systems, and other standards.

As with all Pro-Flex® guidelines, the techniques outlined within this manual/bulletin are subject to all local fuel gas and building codes.

***LIGHTNING SAFTY WARNING**

PROPERLY BONDING and grounding the Corrugated Stainless Steel Tubing (CSST) system may reduce the risk of damage and fire from lightning strike. Lightning is a highly destructive force. Even a nearby lightning strike that does not strike a structure directly can cause systems in the structure to become electronically energized. Differences in potential between systems may cause the charge to arc between systems. Such arching can cause damage to CSST, including holes. Bonding should reduce the risk of arching and related damage.

Deficiency: Unsafe electrical conditions were found under the kitchen sink.

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NI=Not Inspected

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Information: These unsafe conditions include the electrical conductors that were not properly installed in metal conduit to protect the conductors from physical harm or from water. The conduit must be fastened to the structural framing and to the appliance to properly protect the electrical cable. All unsafe conditions should be remedied.

Deficiency: Cable clamps were missing from the air conditioning condensing unit's mechanics disconnect boxes.



Information: Cable clamps protect the insulation on the conductors as they pass through the metal box. Cable clamps should be installed for safety.

References: *E3807.5 Conductors entering cabinets.*

Conductors entering cabinets and panelboards shall be protected from abrasion and shall comply with Section E3806.1.1.

Deficiency: An electrical toggle switch was accessible from the master bathroom bathtub.

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NI=Not Inspected

NP=Not Present

D= Deficiency

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Information: Electrical components such as lighting fixture and exhaust fan toggle switches are not supposed to be installed where they can be accessed from a tub or shower per Section E3901.7 of the IRC. The toggle switches should be relocated for safety.

References: E4001.7 Wet locations.

A switch or circuit breaker located in a wet location or outside of a building shall be enclosed in a weatherproof enclosure or cabinet. Switches shall not be installed within wet locations in tub or shower spaces unless installed as part of a listed tub or shower assembly.

There is no exception to the rule that a common light switch wired to control a fan, lighting outlet, or other load cannot be installed in the bathtub or shower space; however, the code does not provide an exact definition or dimension of tub or shower space. It seems logical, though, that the switch should be out of the reach of someone in the tub or shower. From the Commentary to the IRC.

Deficiency: All electrical outlets in “wet” locations were not protected by Ground Fault Circuit Interrupter devices (GFCIs).

Information: Wet locations are defined, by the 1996 National Electric Code, as any counter outlet in the kitchen, any outlet in a bathroom, garage, exterior, wiring to a whirlpool bath or Jacuzzi or to swimming pools, hot tubs or spas. Wet locations are basically any area where you and the electrical device you are using are likely to come into contact with water. GFCIs became part of the code in the mid 1980's and locations they are required in are constantly being added. The lack of GFCIs is considered to be an unsafe condition. All unsafe conditions should be properly repaired.

References: Section 3902 of the IRC.

E3902.1 Bathroom receptacles, E3902.2 Garage and accessory building receptacles, E3902.3 Outdoor receptacles, E3902.4 Crawl space receptacles, E3902.5 Unfinished basement receptacles, E3902.6 Kitchen receptacles, E3902.7 Sink receptacles, E3902.8 Boathouse receptacles, E3902.9 Boat hoists and E3902.10 Electrically heated floors.

Deficiency: Electrical outlet box extenders were not installed on electrical wall outlets and lighting switch outlet boxes installed through additional wall covering surfaces in the kitchen and bathrooms, etc.

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NI=Not Inspected

NP=Not Present

D= Deficiency

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Information: The electrical outlet boxes were fastened to the wall framing and there are spaces existing between the front of the outlet box and the cover plate. When outlet boxes and switch boxes are installed through additional wall covering materials, such as tile or cultured marble, etc. an outlet box extender is required to be installed to seal the opening between the outlet box and the cover plate. See section E3806.5 of the International Residential Code.

References: *E3806.5 In wall or ceiling.*

In walls or ceilings of concrete, tile or other noncombustible material, boxes shall be installed so that the front edge of the box will not be set back from the finished surface more than 0.25 inch (6.4 mm). In walls and ceilings constructed of wood or other combustible material, outlet boxes shall be flush with the finished surface or project therefrom.

Deficiency: There was no accessible electrical wall outlet for one of the lavatories.



Information: The National Electric Code requires that an electrical wall outlet be installed within 36 inches of the outside edge of each lavatory. A new electrical wall outlet should be installed near the lavatory.

Reference: *E3901.6 Bathroom.*

At least one wall receptacle outlet shall be installed in bathrooms and such outlet shall be located within 36 inches (914 mm) of the outside edge of each lavatory basin. The receptacle outlet shall be located on a wall or partition that is adjacent to the lavatory basin location, or installed on the side or face of the basin cabinet not more than 12 inches (305 mm) below the countertop.

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Deficiency: The dryer and garage 240 volt electrical wall outlets were improper by current standards.

Information: While proper for the time in which the house was constructed, the current code requires that the outlet contain four slots for a direct ground. The fourth slot provides for an electrical grounded (neutral or common conductor). Failure to update the electrical circuit can cause an electrical shock or fire. The electrical wiring and outlet should be updated for safety. If you purchase a new electrical dryer you are advised that the outlet on the new dryer will not fit the existing outlet. If you choose to continue with a less safe circuit, you may to purchase a different appliance cord or an adaptor.

NOTICE: Arc Fault Circuit Interrupters are required on all electrical wall outlets. Appliances with motors, such as your refrigerator freezer, dishwasher, disposer, a freezer or garage door operators, etc. may cause the Arc Fault Circuit Interrupters to trip. This will cause the appliance to stop operating.

Information: Arc Fault Circuit Interrupters are fire suppressive devices that have been found to be of great benefit in reducing the number of house fires. However, Arc Fault Circuit Interrupters cause a great deal of nuisance tripping which causes the occupant of the house to have to reset the Arc Fault Circuit Interrupting breaker in the breaker panel. Arc Fault Circuit Interrupters tripping when attached to a refrigerator can cause the food in the refrigerator to spoil. Arc Fault Circuit Interrupters tripping can also cause you to be locked out of your house if the garage door operator circuit breaker trips.

Reference: 210.12 Arc-Fault Circuit-Interrupter Protection of the 2014 National Electric Code

Arc-fault circuit-interrupter protection shall be provided as required in 210.12 (A) (B), and (C). The arc-fault circuit interrupter shall be installed in a readily accessible location.

(A) Dwelling Units. All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets or devices installed in dwelling unit kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, laundry areas, or similar rooms or areas shall be protected by any of the means described in 210.12(A) (1) through (6):

(1) A listed combination-type arc-fault circuit interrupter, installed to provide protection of the entire branch circuit

(2) A listed branch/feeder-type AFCI installed at the origin of the branch-circuit in combination with a listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet box on the branch circuit. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.

(3) A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet box on the branch circuit where all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch circuit arc-fault circuit interrupter.

b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.

c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.

(4) A listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet on the branch circuit in combination with a listed branch-circuit overcurrent protective device where all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch circuit arc-fault circuit interrupter.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.

c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.

d. The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and shall be listed as such.

(5) If RMC, IMC, EMT, Type MC, or steel-armored Type AC cables meeting the requirements of 250.118, metal wireways, metal auxiliary gutters, and metal outlet and junction boxes are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch circuit type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

(6) Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

Notice: The National Electric Code (NEC) has required the installation of Arc Fault Circuit Interrupting (AFCI) Breakers on 120 volt circuits since the late 1990' s. AFCI breakers were originally required on all bedroom receptacles. Bedroom receptacles include lighting fixtures, ceiling fans and smoke alarms along with electrical wall outlets. Under current codes, AFCIs are required on all 120 volt circuits that do not permanently supply an appliance or on electrical circuits that have Ground Fault Circuit Interrupting (GFCI) protection. The purpose of an AFCI is to turn the electricity off on an electrical circuit when a spark, arc or electrical fire is found in an electrical circuit. The spark or arc is noted by a change in the electrical current flow. AFCIs commonly trip when an appliance is connected to the circuit as a spark often occurs when the appliance is plugged into the wall outlet. Nuisance tripping is a random occurrence that is not discoverable in the course of a one-time visual inspection of a property. If excessive nuisance tripping of an AFCI device is noted please contact a licensed, competent electrician. During an inspection of an occupied house AFCIs cannot be tested due to the possibility of damaging electrical appliances that are connected to an AFCI breaker. As there are no completely accurate testing devices available, AFCIs are tested in unoccupied houses by pressing the "test" button on the AFCI breaker only.

Deficiency: Smoke alarms were not located in all areas currently required and considered necessary for safety. In my opinion the smoke alarm outside the west bedroom was not in the immediate vicinity of the bedroom.

Information: Smoke alarms are required to be located in each sleeping room, outside of each sleeping area and on each story of the structure, at a minimum.

Reference: *R314.3 Location.*

Smoke alarms shall be installed in the following locations:

1. In each sleeping room.

2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.

3. On each additional story of the dwelling, including basements and habitable attics but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

Notice: The inter-connectivity of the smoke alarms could not be verified.

I=Inspected

NI=Not Inspected

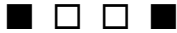
NP=Not Present

D= Deficiency

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Information: The smoke alarms must be inter-connected so that when one alarm is activated, all alarms sound. The inter-connectivity should be verified or the smoke alarms must be inter-connected prior to the expiration of any due diligence investigation period limitation.

III. HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS



A. Heating Equipment

Type of Systems: Central Forced

Energy Sources: Natural Gas and Electricity

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

NOTICE: The types of gas fired furnaces installed do not lend themselves to a visual inspection of the heat exchangers.

Information: The seams and body of the heat exchanger is concealed from view. In order to inspect the heat exchangers, the units must be disassembled, which is beyond the scope of this inspection. There is no visual test to determine the condition of these heat exchangers. A competent HVAC contractor should be contacted to make an inspection of the heat exchangers prior to expiration of any due diligence investigation period.

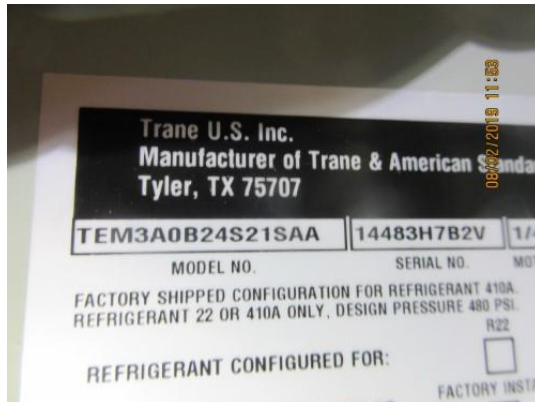


B. Cooling Equipment

Type of Systems: Central Split

Comments: Electricity

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:



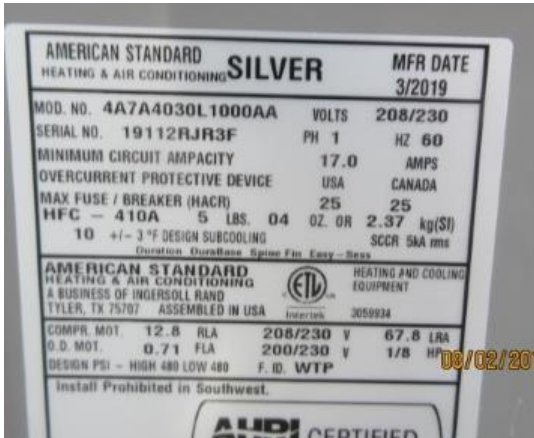
I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Deficiency: The temperature drops across the evaporator coils were inadequate. All three units were new.

Information: The drop should be in the range of 16 to 20 degrees Fahrenheit. The temperature drop measured across the main downstairs coil was 11.9 degrees. The temperature drop measured across the addition coil was 13.0 degrees. The temperature drop measured across the upstairs coil was 16.9 degrees. This may be a sign, although not the only reason, that the units were low on refrigerant and were in need of service. If the units are low on refrigerant it is likely that there is a refrigerant leak in either the evaporator coil, condensing coil or in the refrigerant pipe. These leaks can cause a coil to be replaced and can be expensive to find.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Deficiency: The interior ambient temperature of the addition did not drop during the time of the inspection.

Information: The ambient temperature actually rose 1.8 degrees during the time of the inspection. This indicates that the systems were not operating properly, that the systems were not adequate for the structure and/or that the ducting system was not capable of distributing conditioned air throughout the structure to establish a proper flow pattern for the conditioned air. A competent, licensed HVAC contractor, if one can be found, should be contacted to evaluate the systems and to make the repairs and/or adjustments necessary to provide proper comfort cooling to the structure.

Deficiency: The relative humidity levels inside the house were too high.

Information: Comfortable relative humidity is considered to be from 40% to 50%. Below 40% your skin can get too dry and crack. Above 50% water, perspiration, does not evaporator efficiently from your skin. Levels above 55% make the air feel “heavy” and stagnant and uncomfortable. The relative humidity levels were taken at the end of the inspection after the units had been in operation for more than 2.5 hours. The relative humidity levels ranged from a low of 54% to a high of 59%. The relative humidity levels should be reduced. The higher the relative humidity levels the colder the air inside the house must be to make the interior of the house comfortably habitable. This means the cooling equipment must run longer to create a comfortable climate. This means higher utility bills than are necessary to make the house comfortable.

■ □ □ ■ C. Duct System, Chases, and Vents

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Deficiency: The downstairs plenum appeared to be improperly setup. There was a duct connected to the end of the plenum that prevent proper pressures from building. The duct then feeds three other ducts.



Information: To develop proper air pressure and flow air should pressurized the plenum and then force conditioned air through the conditioned air ducts. The plenum should extended at least a foot beyond the connection to the evaporator coil and at least 6 inches beyond the last duct connection to develop proper pressurization of the conditioned air system according to industry recommendations.

Deficiency: The addition plenum appeared to be improperly sized.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

I	NI	NP	D
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Information: To develop proper air pressure and flow air should be pressurized in the plenum and then force conditioned air through the conditioned air ducts. The plenum should extend at least a foot beyond the connection to the evaporator coil and at least 6 inches beyond the last duct connection to develop proper pressurization of the conditioned air system according to industry recommendations.

Deficiency: The downstairs return air chase appeared to be undersized.



Information: The general rule of thumb is that there must be a minimum of 88 square inches per ton of air conditioning. This rule is based on the circulation of heated air, not refrigerated air. Refrigerated air is more dense than heated air and is more difficult to move. Undersizing the return keeps adequate amounts of air from crossing the evaporator coil. This prevents the unit from maintaining an efficient heat exchange. This is hard on the unit and tends to shorten the life expectancy of the unit. It is also detrimental to you as it makes your air conditioning more expensive to operate. Additional return air flow should be provided. The more return air openings and the more areas that are provided with return air openings the better the air circulation should be.

Deficiency: There was pressure on the return air chases as evidenced by the noise produced by the return air flow.

Information: There should be no pressure on a return air chase system. HVAC equipment used in this area is designed to push air, not to pull air. When the system must pull air, the air flow becomes turbulent and the air flow through the system is decreased. This results in poor heat exchange and higher pressures on the compressor which may shorten the performance life of the equipment and may increase the energy cost of

I=Inspected

NI=Not Inspected

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D= Deficiency

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operating the system. An additional return air chase should be added to reduce or eliminate the pressure on the return air system.

Deficiency: Electrical wiring was noted in the return air chase.



Information: Electrical wiring is not allowed as the insulating materials emit toxic gases if ignited. The electrical wiring should be removed from the chase. The presence of electrical wiring in the return air chase violates Section 300.22(B) of the National Electric Code. The electrical components should be removed from the return air chase.

Reference: Section 300.22 of the National Fire Code

(B) Ducts or Plenums Used for Environmental Air. Only wiring methods consisting of Type MI cable, Type MC cable employing a smooth or corrugated impervious metal sheath without an overall nonmetallic covering, electrical metallic tubing, flexible metallic tubing, intermediate metal conduit, or rigid metal conduit without an overall nonmetallic covering shall be installed in ducts or plenums specifically fabricated to transport environmental air. Flexible metal conduit shall be permitted, in lengths not to exceed 1.2 m (4 ft), to connect physically adjustable equipment and devices permitted to be in these ducts and plenum chambers. The connectors used with flexible metal conduit shall effectively close any openings in the connection. Equipment and devices shall be permitted within such ducts or plenum chambers only if necessary for their direct action upon, or sensing of, the contained air. Where equipment or devices are installed and illumination is necessary to facilitate maintenance and repair, enclosed gasketed-type luminaires shall be permitted.

Deficiency: One of the return air registers was located in the kitchen.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Information: Return air openings are not allowed in bathrooms. The return air opening should be removed from the kitchen and relocated to another part of the house.

References: M1602.2 Prohibited sources. Outdoor and return air for a forced-air heating or cooling system shall not be taken from the following locations:

.... 4. A closet, bathroom, toilet room, kitchen, garage, mechanical room, furnace room or other dwelling unit.

Recirculation of air contaminated with objectionable odors, fumes, or flammable vapors is prohibited because of potential health and safety hazards. Therefore, return air ducts must not serve kitchens, bathrooms, attached garages, or other dwelling units..... (From the Commentary to the IRC.)

Deficiency: Some of the return air openings were located on the lower parts of the walls.



Information: While this type installation was once required for fire safety it is a poor installation for the refrigeration system. Cold air is more dense or “heavier” and settles to the floor. Warm air rises to the ceiling. For the best mechanical efficiency and for better air circulation the warm air should be taken into the refrigeration system from the ceiling. This creates better air flow and reduces the latent and actual heat in the house.

Deficiency: Some of the supply registers were closed.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Information: Closing supply registers has a limited effect on air distribution and may damage the equipment by reducing the flow of air through the conditioned air system. Closing registers increases the pressure in the duct which can increase the air leaks in flexible ducts. All supply registers should be opened. If the air circulation is poor inside the house the ducting needs to be corrected. Closing registers is not a proper method of redistributing conditioned air.

Deficiency: There was no register in the master bathroom toilet room.

Information: A supply duct to the toilet room should be installed and connected to a proper register.

Deficiency: Pinched and misshapen flexible ducts were noted throughout the attic.



Information: It is well known that reducing or changing the shape of a pipe or channel causes turbulence which increases the pressure in the pipe or channel but reduces flow through the pipe, a phenomenon that you may have used in pinching a garden hose to reduce or eliminate water flow from the hose. For some reason, HVAC contractors contend that this well-known and documented fact does not occur in flexible air ducts. It does. The ducts should be properly aligned and supported. The turns in the ducts should be gradual so that the duct is bent and distorted as little as possible. This will help increase the volume of air flowing into the house and may relieve the pressures on the air conditioning equipment. The temperature and humidity levels should be consistent throughout each story of the house.

References: *Typical Manufacturer's Installation Instructions*

Flexible Air Duct installation vs. Flexible Connector installation: There are distinct differences in the use and limitations between "air duct" and "connector," as defined by "Flexible Duct Performance & Installation Standards," Third Edition, published by the Air Diffusion Council. In accordance with NFPA 90A and 90B Standards, national building codes, and local building codes, there are specific limitations on the use and installation of these items.

Particular attention must be paid to the limitation for Connector (Anco System 3100). In all cases, the most stringent of codes must be met. The U.L. label for air duct is rectangular in shape; whereas, the U.L. label for Connector is round. This allows easy differentiation between them. For example, connector CANNOT be used in lengths exceeding 14 lineal feet as per NFPA standards.

Avoid installations where exposure to direct sunlight can occur. Prolonged exposure to sunlight could cause degradation to the vapor barrier.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Install duct fully extended, do NOT install in the compressed state or use excess lengths. This will noticeably increase friction losses.

If suspended, product shall be supported at no less than 4' intervals by hanger, saddle, or ceiling joist or other commonly used support of no less than 1-1/2" width at contact points with maximum permissible sag of 1/2" per lineal foot of spacing between supports.

Avoid bending ducts across sharp corners or incidental contact with metal fixtures, pipes or conduits. Radius at center line of bend shall NOT be less than one duct diameter.

B. GENERAL

1. The routing and length of flexible duct, the number of degrees of each bend and the amount of sag allowed between support joints will have serious effects on system performance due to the increased resistance each introduces. Use the minimum length of flexible duct to make connections. It is not recommended that excess lengths of ducts be installed to allow for possible future relocations of air terminal devices.
2. This product is for indoor use only. Do not install product where exposure to direct sunlight can occur. Prolonged exposure to sunlight may cause degradation of vapor barrier.
3. The inner core may degrade if the duct is positioned near a bio-treatment lamp (UV emitter) installed within the HVAC system
4. Terminal devices shall be supported independently of the flexible duct.
5. Repair torn or damaged vapor barrier/jacket with duct tape listed and labeled to Standard UL 181B. If internal core is penetrated, replace flexible duct or treat as a connection.

I=Inspected

NI=Not Inspected

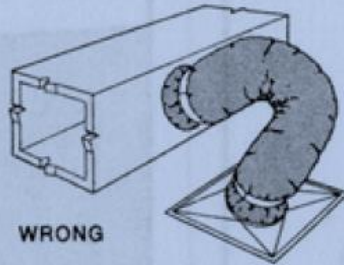
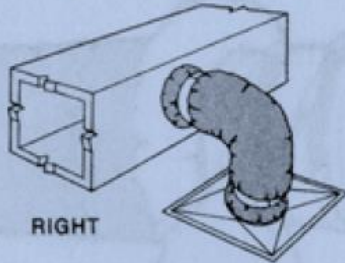
NP=Not Present

D= Deficiency

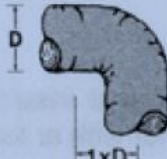
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C. INSTALLATION

1. Install duct fully extended, do not install in the compressed state or use excess lengths. This will noticeably increase friction losses.



2. Avoid bending ducts across sharp corners or incidental contact with metal fixtures, pipes or conduits. Radius at center line shall not be less than one duct diameter.



I	NI	NP	D
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4

Installation Guidelines

4.1 Code Reference

The "authority having jurisdiction" should be referenced to determine what law, ordinance or code shall apply in the use of flexible duct.

Ducts conforming to NFPA 90A or 90B shall meet the following requirements:

- a. Shall be tested in accordance with Sections 5-21 of Underwriters Laboratories Standard for Factory-Made Air Ducts and Air Connectors, UL 181.
- b. Shall be installed in accordance with the conditions of their listing.
- c. Shall be installed within the limitations of the applicable NFPA 90A or 90B Standard.

4.2 General

The routing of flexible duct, the number of bends, the number or degrees in each bend and the amount of sag allowed between support joints will have serious effects on system performance due to the increased resistance each introduces. Use the minimum length of flexible duct to make connections. It is not recommended that excess length of ducts be installed to allow for possible future relocations of air terminal devices.

Avoid installations where exposure to direct sunlight can occur, e.g. turbine vents, sky lights, canopy windows, etc. Prolonged exposure to sunlight will cause degradation of the vapor barrier. Direct exposure to UV light from a source lamp installed within the HVAC system will cause degradation of some inner core/liner materials.

Terminal devices shall be supported independently of the flexible duct.

Repair torn or damaged vapor barrier/jacket with duct tape listed and labeled to Standard UL 181B. If internal core is penetrated, replace flexible duct or treat as a connection.

4.3 Installation and Usage

Install duct fully extended, do not install in the compressed state or use excess lengths. This will noticeably increase friction losses.

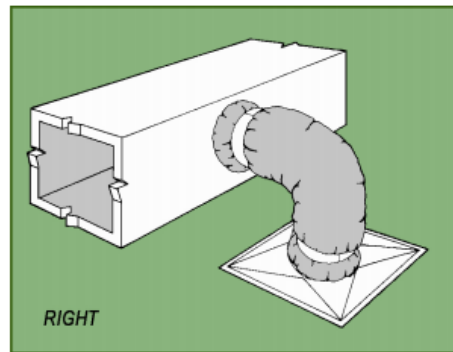


Figure 6

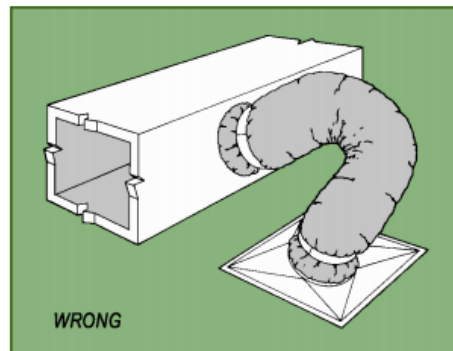


Figure 7

12

ADC Flexible Duct Performance & Installation Standards

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Installation Guidelines . . . continued

4.8 Supporting Flexible Duct

Flexible duct shall be supported at manufacturer's recommended intervals, but at no greater distance than 5' [1.5 m]. Maximum permissible sag is ½" per foot [42 mm per meter] of spacing between supports.

A connection to rigid duct or equipment shall be considered a support joint. Long horizontal duct runs with sharp bends shall have additional supports before and after the bend approximately one duct diameter from the center line of the bend.

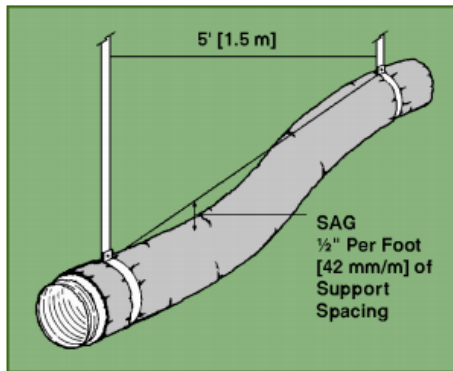


Figure 10

Hanger or saddle material in contact with the flexible duct shall be of sufficient width to prevent any restriction of the internal diameter of the duct when the weight of the supported section rests on the hanger or saddle material. In no case will the material contacting the flexible duct be less than 1½" [38 mm] wide.

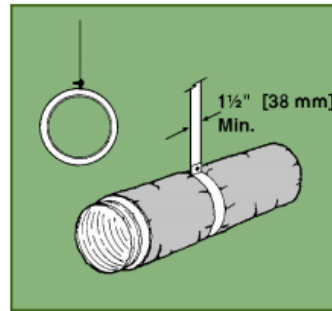


Figure 11

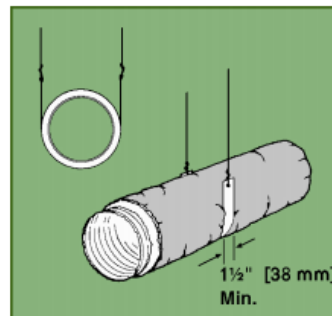


Figure 12

18 | ADC Flexible Duct Performance & Installation Standards, 4th Edition

Typical Flexible Duct Manufacturer's Installation Instructions.

Deficiency: The air registers in various rooms were not located at the end of the room farthest from the return air system and some of the registers were too far from the exterior walls to properly dry the walls.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Information: HVAC installation contractors talk about how far registers will “throw”. That means where the conditioned air hits the floor, not how far the conditioned air travels on the ceiling. Below is an image from a thermal imaging camera that shows where heater air hits a wall. The registers, shown in the yellow box, is 6 feet from the exterior wall. The top of the heated air is hitting the wall more than 2 feet below the ceiling as shown by the blue line. Refrigerated air is more dense, “heavier”, and falls quicker than does heater air. For proper air flow and uniform cooling and drying of the air, all of the air space in each of the various rooms must be involved in the circulation pattern. When the registers are installed near the doorway, the air at the far end of the roof is not included in the circulation pattern. When the registers are located too far from the exterior walls the conditioned air is drawn back into the circulation pattern without reaching the exterior walls. This prevents the exterior walls from drying properly which means that the water in the wall cavities enters the house as water vapor. This increases the relative humidity in the house and promoted microbial organic growths. The lack of conditioned air flow at the exterior walls can usually be felt by you if you stand close to the walls while the refrigerated air is blowing. You can feel where the colder air sinks to the floor.



Deficiency: Some of the registers, such as the breakfast room, master bedroom, den and the addition bedroom registers, were pointed at the floor or at doorway leading to the return air chase instead of

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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at the exterior walls.

Information: For proper air flow and uniform cooling and drying of the air, all of the air space in each of the various rooms must be involved in the circulation pattern. All of the supply registers should be pointed at the exterior walls away from the return air opening for improved air circulation.

Deficiency: One of thermostats relied on mercury. Thermostats reliant on mercury have been deemed to be unsafe.

Information: The thermostats containing mercury should be replaced.

IV. PLUMBING SYSTEM



A. Water Supply System and Fixtures

Location of water meter: on the street right of way

Location of main water supply valve: none noted

Static water pressure reading: 66 psi

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Deficiency: One of the outside faucets dripped.



Information: The faucet valve should be repaired or replaced.

Deficiency: There were harmonics in the master bathroom supply pipes.

Information: Harmonics is a whistling or humming noise that indicates vibration in the pipes. Vibration produces metal fatigue and can cause the pipes to crack or break. The source(s) of the harmonics should be determined and corrected.

Deficiency: There were gaps in the caulk of the bathtub/tile junctions in the bathrooms.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Information: The bathtub/tile junctions should be caulked.

Deficiency: Back flow prevention devices were not installed on all of the exterior faucets.



Information: Back flow prevention devices are required on all exterior faucets to reduce the possibility of contamination of the potable water supply system. It is recommended that they be installed.

Deficiency: There were no sediment traps or “dirty legs” installed on the natural gas distribution pipes prior to the connections to the gas fired heaters and water heater.



I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Information: Sediment traps are required to collect debris in the natural gas. Debris can cause gas valves to stay open which will keep the gas flowing to the burners. The continual operation of the burners can cause the unit(s) to catch fire. Proper sediment traps should be installed where required for safety.

References: G2419.4 (408.4) Sediment trap.

Where a sediment trap is not incorporated as part of the gas utilization equipment, a sediment trap shall be installed downstream of the equipment shut-off valve as close to the inlet of the equipment as practical. The sediment trap shall be either a tee fitting with a capped nipple in the bottom opening of the run of the tee or other device approved as an effective sediment trap. Illuminating appliances, ranges, clothes dryers and outdoor grills need not be so equipped.

Sediment traps are designed to cause the gas flow to change direction 90 degrees at the sediment collection point, thus causing the solid or liquid contaminants to drop out of the gas flow. See Commentary Figure G2419.4(1).

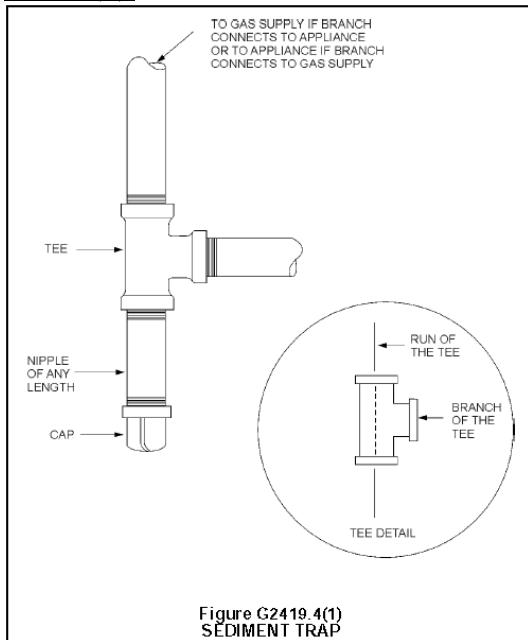


Figure G2419.4(1)
SEDIMENT TRAP

■ □ □ ■ **B. Drains, Wastes, and Vents**

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

NOTICE: When a house is newly built or remodeled, or when a house has been vacated from even for a short period of time, it is not unusual for the plumbing system to back up when the new owner occupies the structure. This is due to the fact that the contractors building or remodeling the house use the plumbing system as a method of cleaning everything from paint to putty to anything else you can think of. Solids in the pipes tend to congeal as water drains from the pipes through lack of use and the solids can form barriers in the pipes. Before occupying the structure, you should repeatedly fill all plumbing fixture in an attempt to ensure that the drains will operate once you and your family have moved into the property.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Deficiency: Some of the sewer vent pipes in the attic contained horizontal or reversed sloped runs.



Information: The purpose of the vent is to allow air into the drain system so that a vacuum does not form. A vacuum would greatly reduce the speed at which the fixtures drain. It can also prevent the fixtures from draining. A horizontal run means that the flow of air has been effectively stopped due to atmospheric pressure. The pipes must maintain a slight upward slope, at a minimum.

Deficiency: There were no elbows on the terminations of some of the drain pipes.



Information: Elbow terminations should be installed on all drain pipe terminations so that the terminations point at the ground.

Deficiency: The kitchen sink was not properly or adequately sloped to drain all water from the sink.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Information: The tub should be adjusted to drain completely per chapter 27 of the IRC. If the sink is improperly manufactured the sink should be returned to the manufacturer for replacement.

Notice: The shower floor was recessed below the finished grade of the foundation.

Information: For this reason, it is not possible for the shower pan to leak unless water collects on the floor of the shower. The concrete “walls” of the foundation act as a pan. The concrete does not extend very high, however. By looking, you can probably judge how deep your concrete “shower pan” is. Should the shower begin to drain slowly and water collects until it is higher than the surrounding floor elevation, your shower may leak. You are also advised that leaks around the shower stall are not likely to be caused by a leak or leaks in the concrete sides of the shower stall. This means that this construction of the shower is preferable as it is unlikely that the shower “pan” will ever leak.



C. Water Heating Equipment

Energy Sources: Natural Gas and Electricity

Capacity: 30 and 50 Gallons

Comments:

MAKE: USCRAFTMASTER MODEL No. E2F30HD035V SERIAL No. 1244T480725

MAKE: Bradford White MODEL No. MI5036FBN7 SERIAL No. BG6412815

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Deficiency: The temperature and pressure relief valve on the Bradford White unit was corroded and old.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

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Information: An attempt was made to operate the device and the valve would not open under moderate pressure. The temperature and pressure relief valve is a safety device. Should the burner valve remain open, the temperature of the water in the system would continue to increase however; the water could not boil as there would be no room to allow the water to turn to steam. When a water valve is opened, the water would turn instantly into steam if the temperature of the water is above 212 degrees Fahrenheit. This action would cause the tank to explode. The temperature and pressure relief valve is required to be operated periodically to keep the valve from corroding. As the valve was not operable, the valve should be replaced for safety.

■ □ □ ■ **D. Hydro-Massage Therapy Equipment**

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Deficiency: The wall switch controlling the operation of the pump was a toggle switch.

Information: The wall switch controlling the motor is required to be a timer, not a toggle switch. The requirement is made so that the pump will not be accidentally operated when the tub is empty. The toggle switch should be replaced with a timer for safety.

Deficiency: There was no visible ground fault circuit interrupting (G.F.C.I.) device protecting the unit.

Information: The location of the G.F.C.I. should be determined or a properly accessible G.F.C.I. should be installed. A ground fault circuit interrupter is required to reduce the possibility of electrocution.

V. APPLIANCES

■ □ □ ■ **A Dishwashers**

Comments:

MAKE: Maytag MODEL No. MDB5100AWB SERIAL No. 27241314AC

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Notice: The toggle switch controlling the dishwasher was not identified.

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

I	NI	NP	D
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Information: All electrical control devices are required to be identified unless the purpose of the control device is clear. The toggle switch should be labeled to prevent a repairman from being called when the dishwasher is not operating and the switch is simply turned off.

Reference: *E3404.12 Identification of disconnecting means.*

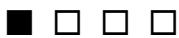
Each disconnecting means shall be legibly marked to indicate its purpose, except where located and arranged so that the purpose is evident. The marking shall have the durability to withstand the environment involved.

Notice: A number of units manufactured by the Maytag Corporation, which include the Jennair trade name, have recently been recalled due to a defect that causes the units to catch fire. The exact model numbers of the units that have this defect are not yet known. It should be determined if this unit is subject to the recall. The models and serial numbers listed to date on the Maytag website are as follows. The website should be monitored to see if other models will be included.

Reference: *US Consumer Product Safety Commission*

Description: The recall includes Maytag®, Amana®, Jenn-Air®, Admiral®, Magic Chef®, Performa by Maytag® and Crosley® brand dishwashers with plastic tubs and certain serial numbers. The affected dishwashers were manufactured with black, bisque, white, silver and stainless steel front panels. The brand name is printed on the front of the dishwasher. The model and serial numbers are printed on a label located inside the plastic tub on a tag near the left side of the door opening. Serial numbers will start or end with one of the following sequences.

SERIAL NUMBER STARTING WITH	OR	SERIAL NUMBER ENDING WITH
NW39, NW40, NW41, NW42, NW43, NW44, NW45, NW46, NW47, NW48, NW49, NW50, NW51, NW52, NY01, NY02, NY03, NY04, NY05, NY06, NY07, NY08, NY09, NY10, NY11, NY12, NY13, NY14, NY15, NY16, NY17, NY18, NY19		JC, JE, JG, JJ, JL, JN, JP, JR, JT, JV, JX, LA, LC, LE, LG, LJ, LL, LN, LP, LR, LT, LV, LX, NA, NC, NE, NG, NJ, NL, NN, NP, NR



B. Food Waste Disposers

Comments:

MAKE: Kenmore MODEL No. 587.70321410 SERIAL No. TG400152S59

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

I	NI	NP	D
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Information: There were no visible defects noted in the operation of the disposer that appeared to require immediate repair at the time of the inspection, in my opinion.

■ □ □ ■ **C. Range Hood and Exhaust Systems**

Comments: downdraft component of the range

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Deficiency: Most of the range vent pipe was made of inadequate material.



Information: The purpose of the vent pipe is twofold. The first is to remove odors and contaminants. The second is to contain a grease fire should one begin. The material used is not approved by the American Society for Testing and Materials (ASTM) to contain a fire. The vent pipe should be seamless galvanized steel, stainless steel or copper pipe.

References: *M1502.2 Duct material.*

Single-wall ducts serving range hoods shall be constructed of galvanized steel, stainless steel or copper. Exception: Ducts for domestic kitchen cooking appliances equipped with downdraft exhaust systems shall be permitted to be constructed of schedule 40 PVC pipe provided that the installation complies with all of the following:

- 1. The duct shall be installed under a concrete slab poured on grade.*
- 2. The under-floor trench in which the duct is installed shall be completely backfilled with sand or gravel.*
- 3. The PVC duct shall extend not greater than 1 inch (25.4 mm) above the indoor concrete floor surface.*
- 4. The PVC duct shall extend not greater than 1 inch (25.4 mm) above grade outside of the building, and 5. The PVC ducts shall be solvent cemented.*

■ □ □ ■ **D. Ranges, Cooktops, and Ovens**

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

RANGE MAKE: Maytag MODEL No. JED8430ADB SERIAL No. 19411200CT ENERGY SOURCE: electricity 7.0kW

I=Inspected

NI=Not Inspected

NP=Not Present

D= Deficiency

I	NI	NP	D
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Information: There were no visible defects noted in the operation of the range that appeared to require immediate repair at the time of the inspection, in my opinion.

OVEN MAKE: Bosch MODEL No. HBL3550UC/09 SERIAL No. 911000082 ENERGY SOURCE: electricity 7.2 kW

Information: The ovens were operated to test the calibration of the thermostats. The thermostats were found to be calibrated within the 25 degree variance allowed for temperature settings. There were no visible defects noted in the operation of the ovens that appeared to require immediate repair at the time of the inspection, in my opinion.

E. Microwave Ovens

Comments:

MAKE: Panasonic MODEL No. NNSD987S SERIAL No. 6A74040431

Information: There were no visible defects noted in the operation of the microwave oven that appeared to require immediate repair at the time of the inspection, in my opinion.

F. Mechanical Exhaust Vents and Bathroom Heaters

Comments:

Information: BATHROOM EXHAUST FANS ONLY: There were no visible defects noted in the bathroom exhaust fans that appeared to require immediate repair at the time of the inspection, in my opinion.

G. Garage Door Operators

Comments:

Items noted during the visual inspection that were deemed deficient, are in need of repair, adjustment, restoration, that require comment, continuation of the due diligence process and/or servicing or items noted for information include but are not limited to:

Deficiency: The garage door opener did not reverse when the door path was obstructed.

Information: All garage door openers contain a sensitivity adjustment. This control can be manipulated so that the slightest pressure on the bottom of the door will cause the opener to reverse its direction. This is an important safety feature of the unit. The unit should be adjusted for safety.

Deficiency: The electronic door opening safety sensors were installed too high above the floor of the garage.

Information: The sensors should be located within the first six inches above the floor to be effective.

H. Dryer Exhaust Systems

Comments:

Information: There were no visible defects noted in the visible dryer vent system that appeared to require immediate repair at the time of the inspection, in my opinion.