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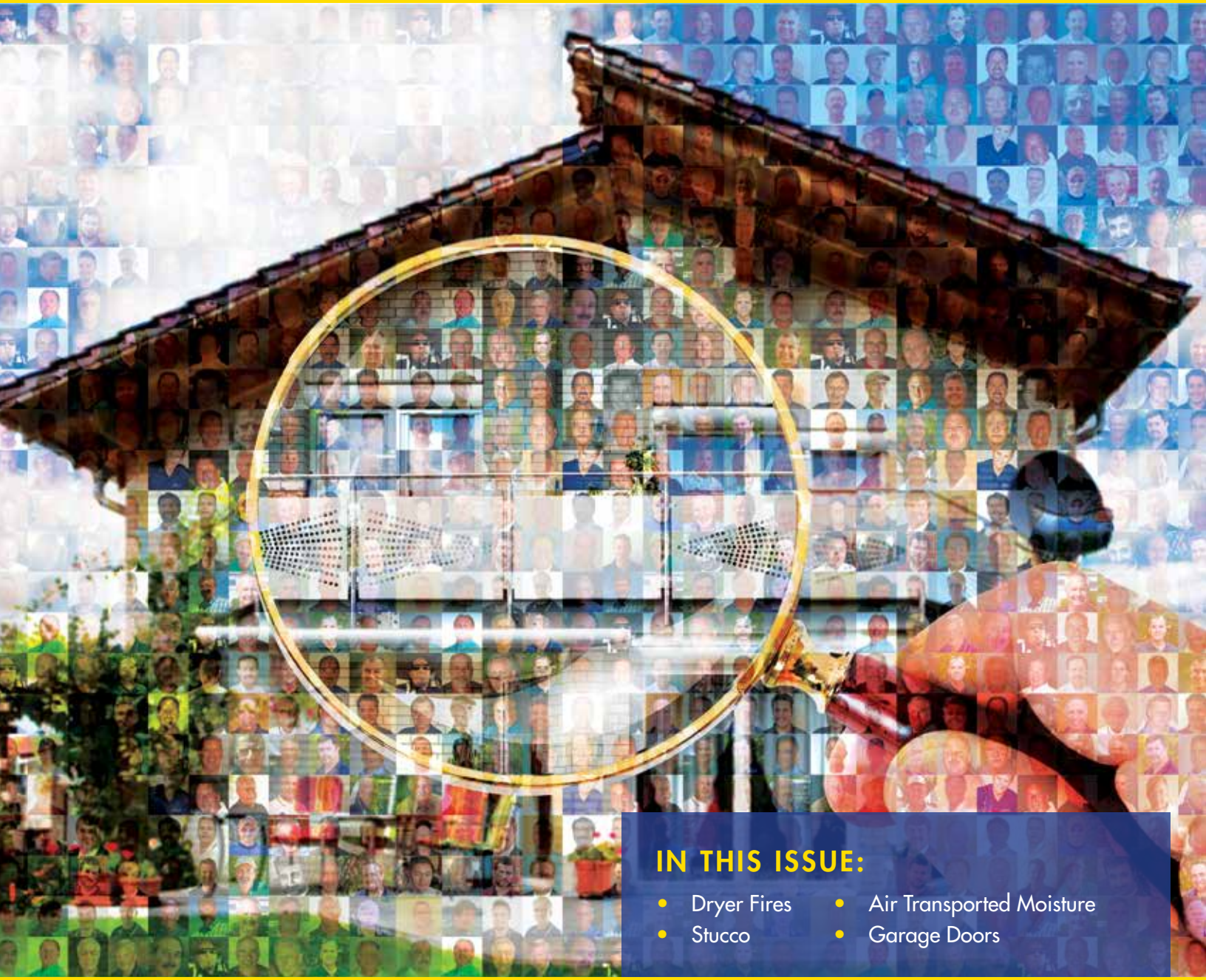

IN THIS ISSUE:

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— Alan, HousePro Home Inspections

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CALIFORNIA REAL ESTATE INSPECTION ASSOCIATION CREIA

IN THIS ISSUE:

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CHAIRMAN'S MESSAGE

BY KENNETH COLLINS, CCI, CHAIRMAN OF THE BOARD

Wow, 40 years… It is such an honor to be trusted as Chairman of the Board 2016/17, following such great past CREIA leaders.

A little about myself, I earned my CREIA Certification in October 2000 after graduating from Inspection Training Associates (ITA). I remember attending CREIA's 25th Anniversary conference in 2001. **One of the things that stood out for me was that there were so many talented inspectors, but what really amazed me was that they were willing to help me become a successful inspector. This is one of the many ways CREIA stands out.**

After becoming a member of CREIA, I immediately began attending my local chapter's monthly meetings. I have always felt very fortunate to belong to the Silicon Valley CREIA/ASHI Chapter with so many great members, like Jerry McCarthy, Douglas Hansen, Alan Huntzinger, Steve Fishman, Craig Moorhead, Perry Farnum and Skip Walker. I have always tried to be very active in my chapter, serving on various committees and on the board. Chapter participant numbers always go up and down and some guest speakers are better than others, but I always learn something new. Sometimes it's from the educational speakers, other times it is just in conversation with other experienced inspectors at my table. I still wonder how someone can be successful in this business without attending his or her chapter meetings. I've always felt that it's my responsibility as a CCI to give back and help new CREIA members because of the help I received from my fellow chapter inspectors.

People often ask me what I like about being a Home Inspector. It's because I am always learning, I am helping people make more informed decisions about the major purchase they are about to make and my job is simply to tell the truth. Also one of the best things about being a home inspector is that many of my competitors are my friends and we're always trying to promote professionalism in our field.

I never expected CREIA to build my business; I always figured that that was my job. What I wanted from CREIA was a source of education, collaboration and for the real estate community to understand the advantages of referring a CCI. That CCI's have to pass a very difficult written test in person, they have to maintain continuing education, follow a code of ethics and standards of practice. Unfortunately, in my area, many Realtors have still not heard of CREIA and if they have, many do not distinguish it from other inspection organizations. We are working to change that. I feel it's very important that Realtors, buyers and sellers understand what it takes to become a CCI. I can tell you that the Realtors that refer my business as well as my clients know about CREIA because I tell them and proudly wear my CREIA badge! My CREIA logo is on my reports, marketing materials and on my truck. I would like to urge all CREIA members to spread the word and be proud of what you had to accomplish to become a Certified CREIA Inspector!

As Chairman, one of the things I would like to do is build a closer relationship between CREIA and CAR. Being California specific, we should be working together to help California buyers and sellers.

I strongly feel that CREIA has some of the best and brightest home inspectors in California volunteering their time as committee chairs and on the Board of Directors. I am really excited to get to work with this current Board and committee members. **Our goal and my promise are to promote CREIA and provide top-notch educational opportunities.**

Ken Collins, CCI, is owner of Magnum Property Inspections, Inc. in Silicon Valley. Ken has served on the CREIA Board of Directors as Regional Three Director, Secretary, and now Chairman of the Board 2016-2017.

PROPER DRYER VENTING & MAINTENANCE THE KEY TO REDUCED FIRE RISK

BY SKIP WALKER, MCI

Dryer venting isn't a very glamorous topic, but if we look at residential clothes dryer-related fires as a percentage of the total number of fires per year – it is a very significant safety concern. Most inspectors have some inspection "pet peeves;" that is those things that they pay little special attention to, perhaps because of some special knowledge or experience. One of mine is clothes dryer venting. There are about 15,500 residential dryer-related fires per year. Dryer-related fires rank as a leading cause of residential fires and are responsible for over $200,000,000 per year in property losses. Between 2006 and 2010, dryers were responsible for approximately 400 injuries per year with an average of 30 fatalities annually. About 84% of all clothes dryer-related fires occur in 1 and 2 unit single-family dwellings.

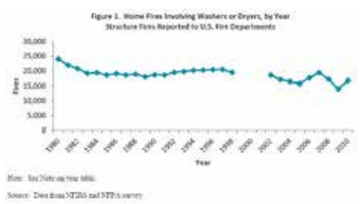

Illustration: NFPA Dryer Fires 2012

The source of about 92% of laundry fires is the clothes dryer. Dryer fires tend be smoldering fires. As we know, the typical ionization smoke alarm is very poor in detecting smoldering fires. Per the CPSC, the typical (ionization) smoke alarm will provide adequate warning in only 45%-49% of fires.

Dryer-related fires tend to peak during the mid-day hours when occupants are awake and more likely to detect the fire. This timing impacts the fire death and injury rates. If dryer fires occurred during sleeping hours, the fire death rate would almost certainly be much higher. Injuries tend to be higher than the overall residential fire average in dryer fires. Loss of life in dryer fires is relatively low compared to the number of incidents. In older dwellings, the laundry is often located in the garage separated from the living areas and away from the bedrooms. In modern construction, there is a tendency to locate laundry facilities inside the living areas and often on the same floor as the sleeping areas. This increases the risk of fatalities should a dryer be left running in the evening when the occupants are sleeping.

Illustration: US Fire Administration Dryer Fires 2008-2010

The risk of a fire is roughly the same for gas and electric dryers. Many believe that keeping the lint trap clean is the key to the safe operation of the appliance. This is only partially true. Most dryer manufacturers recommend that the dryer's side panels be removed periodically and that the interior and vent system be cleaned as part of the appliance maintenance. This is because lint escapes the vent system over time and collects around the interior components.

I randomly selected an LG Brand gas dryer and looked at the maintenance requirements. LG recommends cleaning the dryer interior and vent system at one year and then every one to two years thereafter. What do you suppose the odds are of that actually happening?

Per the US Fire Administration/National Fire Incident Reporting System, the 2008-2010 statistics show that the leading cause of dryer-related fires is **"Failure to Clean."** Improper dryer and vent maintenance causes the majority of dryer-related fires. Lint build-up in the dryer and vent system has a number of effects. The lint itself is highly flammable. The accumulation of lint inside the dryer and vent system restricts exhaust airflow. The restricted airflow across the dryer heat exchanger will result in an increase in air and heat exchanger temperature. Clothes dyers are equipped with over temperature cutout switches – the same as furnaces. However, prolonged exposure to high temperatures may desensitize the switches or cause outright switch failure. In this case, the system continues to operate until it becomes hot enough to ignite the lint. The lint will burn like a fuse along the dryer vent duct. Ducts often run through wall cavities, through crawlspaces and through attics. Tests conducted by a Jupiter, Florida based lab measured vent firewall cavity temperatures of around 1000 F within 150 seconds of the lint ignition. The bottom line - these fires burn hot and they burn fast.

Please take a moment to view the YouTube video about Dryer Fires on the following Webpage: https://www.creia.org/press-and-media

If you don't already, I suggest including some language recommending periodic maintenance of the dryer and vent system as part of your inspection reporting. For example, I use this comment:

> **Periodic Cleaning is Critical to Safe Operation of the Clothes Dryer:** Periodic inspection and cleaning of

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> the dryer and vent system is strongly recommended. Lint build-up in the dryer and vent system poses a significant fire and safety risk. Dryer-related fires are one of the leading causes of residential appliance related fires in the US. Please refer to the manufacturer's instructions for your dryer's specific maintenance requirements. Improper maintenance can result in unsafe operating conditions. Failure to properly maintain the appliance may potentially void the manufacturer's warranty and or any home warranty coverage. Interested parties should consult with a qualified appliance service technician for additional information and/or service.

The CREIA Standards of Practice give us the following guidance as to what must be inspected:

7. Heating and Cooling

A. Items to be inspected:

1. Heating equipment
2. Central cooling equipment
3. Energy source and connections
4. Combustion air and exhaust vent systems
5. Condensate drainage
6. Conditioned air distribution systems

Since the clothes dryer vent is an exhaust vent system, it must be included in our inspections. The *how* we inspect and *the extent of the comments* are left to the individual inspector. I suggest considering a **"Best Practices"** approach to the inspection of all systems. In doing this, we look at the problems a system causes and work back to the components or issues that caused the problem. Then break the inspection of the system down into its components and the conditions that cause the problems. Each component would then have its own series of installation requirements and defect conditions.

The current California Mechanical and Energy Codes (2013) require the following for dryer installations:

504.3 Clothes Dryers. Moisture exhaust ducts shall terminate on the outside of the building and shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. Ducts for exhausting clothes dryers shall not be connected or installed with sheet metal screws or other fasteners that will obstruct the flow. Clothes dryer moisture exhaust ducts shall not be connected to a gas vent connector, gas vent; or chimney, and shall only serve clothes dryers. Clothes dryer moisture exhaust ducts shall not extend into or through ducts or plenums.

CMC 504.3.1 Domestic Clothes Dryers. Where a compartment or space for a domestic clothes dryer is provided, not less than a 4-inch diameter moisture exhaust duct of approved material shall be installed in accordance with this section and Section 504.0.

Where a closet is designed for the installation of a clothes dryer, an opening of not less than 100 square inches for makeup air shall be provided in the door or by other approved means.

504.3.1.1 Domestic Dryer Vents. Domestic clothes dryer moisture exhaust ducts shall be of metal and shall have smooth interior surfaces.

Exception: Listed clothes dryer transition ducts not more than 6 feet in length shall be permitted to be used in connection with domestic dryer exhausts. Flexible clothes dryer transition ducts shall not be concealed within construction.

504.3.1.2 Length Limitation. Unless otherwise permitted or required by the dryer manufacturer's instructions and approved by the Authority Having Jurisdiction, domestic dryer moisture exhaust ducts shall not exceed a total combined horizontal and vertical length of 14 feet, including two 90-degree elbows. A length of 2 feet shall be deducted for each 90-degree elbow in excess of two.

CMC 905.0 Clothes Dryers.

905.1 Clearance. The installation of clothes dryers shall comply with the following requirements:

(1) Listed Type 1 clothes dryers shall be installed with a clearance of not less than 6 inches from adjacent combustible material. Clothes dryers listed for installation at reduced clearances shall be installed in accordance with their listing. Type l clothes dryers installed in closets shall be listed for such installation.

CMC 905.2 Exhausting to the Outdoors. 1 and Type 2 clothes dryers shall be exhausted to the outside air. [NFPA 54: 1 0.4.2]

CMC 905.3 Provisions for Makeup Air. Makeup air shall be provided in accordance with the following:

(1) Makeup air shall be provided for Type 1 clothes dryers in accordance with the manufacturer's instructions. [NFPA 54: 10.4.3.1]

CMC 905.4 Exhaust Ducts for 1 Clothes Exhaust ducts for 1 clothes shall be in accordance with the following:

(1) A clothes exhaust duct shall not be connected into a vent connector, gas vent, chimney, crawl space, attic, or other concealed space. [NFPA 54:10.4.4.1J

(2) Ducts for exhausting clothes dryers shall not be assembled with screws or other fastening means that extend into the duct and that are capable of catching lint and reduce the efficiency of the exhaust system. [NFPA 54:}0.4.4.2]

(3) Exhaust ducts shall be constructed of rigid metallic material. Transition ducts used to connect the dryer to the exhaust duct shall be listed for that application or installed in accordance with the clothes dryer manufacturer's installation instructions. [NFPA 54: 10.4.4.3]

CMC 504.5 Termination of Environmental Air Ducts. Environmental air duct exhaust shall terminate not less than 3 feet from a property line and 3 feet from openings into the building.

CA Energy Code 150 (h)

3. Outdoor condensing units.

A. Clearances. Installed air conditioner and heat pump outdoor condensing unit hall have a clearance of at least five (5) from the outlet of any dryer vent.

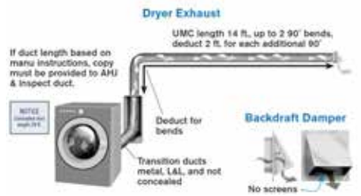

Illustration Courtesy of CodeCheck®

Now, let's talk about the inspection of the dryer venting by the looking at the vent system components and issues.

Is a dryer vent required? There is no requirement that a clothes dryer be installed. However, if provisions to install a dryer exist, per the CMC, a dryer vent system must be installed. The only exception to this would be if a condensing/ventless dryer were installed. That would require a jurisdictional exception. Condensing dryers remove water from the dryer air by condensing the air on a chilled coil. Condensing dryers are expensive and will always be electric – never gas. Condensing dryers do require a means to drain condensate

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from the system. The condensate drain often uses the washer drain.

Maximum Dryer Vent Length: The longer the vent run, the harder the dryer fan has to work, the slower the airflow is across the dryer heat exchanger, the more interior duct surface area to collect lint. Lint on the vent interior creates friction, further restricting airflow. Lower airflow across the heat exchanger means higher air temperatures. All this translates into a higher fire risk and more rigorous maintenance requirements and. In general, dryer vents that run vertically will require more maintenance than horizontal runs. It is harder to push wet lint straight up than it is to move it horizontally.

The maximum vent length allowed under the CMC is 14 feet. This includes an allowance for 2-90 Ell's. For each additional 90 Ell, we would deduct 2 feet from the maximum length allowed. The AHJ may allow longer runs. Exceptions should be based on the appliance manufacturers specifications or an engineered solution and that may require a specific dryer to be installed. In general, the shorter and the straighter the dryer vent runs – the better. In some installations, we may see signs posted at the laundry area that the dryer installed must be rated for some stated minimum dryer vent length. There are Ell's specifically engineered for dryer venting. These have long sweeps and may not require a reduction in vent length when installed.

Minimum Vent Diameter: The smaller the vent diameter, the harder the fan has to work to move air. Because the surface area is reduced, a given amount of lint creates a more significant impact on airflow. The minimum vent diameter allowed under the CMC is 4-inches. Nor should it be less than the appliance vent connection.

Vent Material: Any vent run over 6 feet should be metal. As you will see in the video posted on CREIA's Website, dryer lint burns very quickly and very hot. It is critical that the vent material be metal. The CMC requires that all dryer vents be an approved material that has a smooth interior surface. This is generally single-wall vent material such as used for gas appliance vents.

Transition Ducts: The transition duct should be no more than 6 feet long. Shorter is better. The "transition duct" term is new to the CMC 2007 and is used to describe the flexible appliance connector. The CMC now requires that the transition ducts be LISTED. Meaning they must be tested for use in a dryer venting system by an independent lab such as UL. In general, the old white plastic and many of the thin-foil/plastic flexible ducts will no longer comply. The manufacturers installation instructions generally exclude those materials as well. After viewing the video referenced elsewhere, it should be very clear why running the flexible ducts through a concealed space is not allowed.

Per the CMC, the maximum length of the dryer transition duct is 6 feet. Any portion of the dryer vent over 6 feet or that passes through concealed spaces, etc., should be metal. Many states use the I-Codes (IMC/IRC), which have a maximum transition duct length of 8 feet. Consequently, the dryer transition ducts sold are almost always packaged in 8-foot long sections. These should be shortened to a maximum of 6 feet when they are installed. In practice, this seldom seems to occur. The transition duct should be as short as possible while still allowing the appliance to be moved for cleaning and service. Any unnecessary material, bends, kinks, etc., should be removed as they can significantly restrict airflow.

The CMC permits one section of transition duct. Transition ducts should not be joined together to make longer sections and should not pass through concealed spaces, bulkheads, walls, fire separations, etc.

Dryer Vent Termination: The dryer vent should terminate at the exterior using an appropriate back-draft damper. The vent should terminate at least 3 feet from any building opening, air intake or the property line. The dryer should terminate at least five feet away from AC condensing coils to avoid lint build-up in the coil. The clearance to the AC coil is actually a CA Energy Code requirement. Dryer vent terminations should not be screened.

The air discharging from the dryer vent is warm. On a cold evening, an improperly terminated dryer opening can make an inviting resting spot for all sorts of critters. When critters take up residence, they can build nests that obstruct airflow that could result in the dryer overheating.

General Dryer Vent Installation: The dryer vent and transition duct should be free from mechanical damage, sharp bends, etc. Any areas that are impinged, kinked, or mechanically damaged will obstruct airflow and collect lint. Mechanical connections should be made using tape or approved fastening methods. We should never see screws or fasteners that project into the dryer exhaust flow, as they will collect lint. The male ends of the vent should be installed "pointing" in the direction of airflow.

The dryer vent should not pass through a plenum or ductwork. It is not uncommon in older dwellings to find the dryer vent routed through the wood enclosure under the garage furnace. That enclosure often serves as the return air plenum. In that installation, the air pressure inside the plenum is negative when the furnace is operating. When the dryer is operating, the duct is under positive pressure. With gas dryers, the vent also serves to vent combustion by products to the exterior. Routing the dryer duct through the return creates a situation where the dryer byproducts of combustion can be drawn into the living areas. If a fire starts in the dryer duct, both the smoke and fire will have a clear path into the living space.

Other Clothes Dryer Vent Considerations: A typical 12 lbs. load of laundry weighs around 20 lbs. when it comes out of the washer. Even more in older washers. That is at about 8 lbs. or approximately 1 gallon of water that must be removed from the clothes to dry them. That means that about a gallon of water is being exhausted from the dryer during a typical dry cycle. Any improperly sealed dryer ducts introduce a significant amount of moisture into the surrounding area. That much moisture can cause a host of issues - not only damage to wood members but environmental issues as well.

A typical residential clothes dryer exhausts approximately 200 CFM of air to the exterior. If the dryer is installed in a confined space, such as a closet, there should be a provision to provide makeup air to the area. In confined areas, the CMC requires a minimum makeup air opening of 100 square inches. Makeup air may be taken from the living space or under certain circumstances from the exterior.

Just as a gas water heater or furnace, a gas clothes dryer also has combustion air requirements. Both gas and electric dryers exhaust air to the exterior as part of their normal operation. When a clothes dryer is running, it competes with other appliances for interior air. This is especially true in confined spaces with gas burning appliances and a dryer installed. How many times do we see a furnace and water heater installed in an interior laundry area where there is an exhaust fan and little to no combustion air? Turn them all on, close the interior laundry door and you can imagine what could happen. At least in my service area, few local jurisdictions seem to enforce the requirement for makeup air in confined laundry areas.

The clothes dryer discharge should not be vented with any other exhaust systems, e.g., kitchen, bath or tied into such things as plumbing vents or gas appliance vents.

I've actually seen a dryer vented into a B-Vent serving the adjacent water heater and furnace. Lint was blowing out of the water heater draft hood when I was there. It is important that

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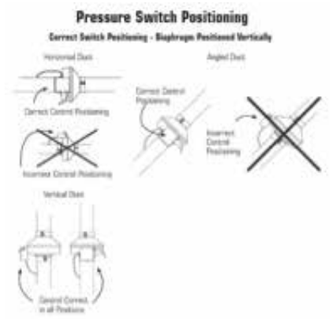
the dryer terminate at the exterior. This can be difficult to verify sometimes, especially in large homes and condos. While testing laundry equipment is not required, turning on the dryer can be helpful to help verify that the dryer vent actually terminates at the exterior. With the dryer running, walk the exterior and look for the vent termination with airflow.

The CMC does not specifically deal with the installation of dryer booster fans. Booster fans are engineered specifically to extend the maximum dryer vent length. The 2003 IRC had a general provision for dryer booster fans. This was removed in the 2006 IRC. The provision was eliminated because a dryer booster fan must be matched to the specific dryer model installed and not to the dwelling. In general, the booster fan CFM output must be matched to the CFM output of the dryer installed. The booster fan installation instructions will usually require the fan to be installed at least 5 to 15 feet from the clothes dryer. Installing the booster fan as close as possible to the termination is usually preferred. This allows the air and lint in the exhaust airflow a chance to dry somewhat. Installation of the fan too close to the dryer may result in clogging of the fan blades with wet lint. The booster fan manufacturer may allow lesser distances if a secondary lint trap is installed between the dryer and the booster fan. The fan pressure switch orientation is important. The pressure switch must be oriented per the installation instruction. The fan assembly should be listed. In practice, few actually are listed.

Fantech® Dryer Booster Fan

New or old, dryer vent systems are almost always problematic. Many vents are DIY/handyman installations and are often improperly installed. In my business area, there is a new high-end condo complex where the units have gas dryer hook-ups but most – not all – of the units have no provision to vent a dryer. There is another newer complex with the gas dryer and gas water heater located in a confined area with no provision for combustion or makeup air.



Fantech® Pressure Switch Orientation

A few years ago, a local building official caught a dryer venting issue at an apartment complex that was under construction. The clothes dryers, kitchen and bath exhaust systems were all vented using the same duct system. This installation was designed by a mechanical engineer, had passed plan check and was being installed by a well-respected mechanical contractor. Fortunately, the building inspector prevailed even though the developer brought significant pressure on the city to allow the installation.

Finally, one last example of how a seemingly small mistake can cause a huge problem. This involves litigation on a newer condo project. A mechanical engineer designed the dryer vent system, which again passed the plan check. A well-respected mechanical contractor installed the system per the approved plans. The complex was signed off by the City. The engineer designed custom dryer terminations **with screens**. In the plans, they were actually referred to as "Lint Traps" and lint traps they were. All the clothes dryers vented vertically to the roof. The problem was discovered shortly after the property was fully occupied. In that short time, the dryer vents were all clogged, connections in many blew apart and were venting into the attic. Just imagine how much moisture was pumped into the attic area from all those dryers. The entire roof framing assembly was moisture damaged. The excessive moisture caused mold issues that required remediation. Of course, the occupants had to be relocated during repairs. The damages totaled in the neighborhood of $10,000,000.

Whenever someone tells me "It's just a dryer vent." I reply that there are 15,500 dryer-related fires per year. Sometimes seemingly small things have serious consequences.

SOURCES:

2013 California Mechanical Code

Home Fires Involving Clothes Washers or Dryers, NFPA 2012, John Hall

2008-2010 Residential Fire Loss Estimates, CPSC 2012, David Miller

Topical Fire Report Series: Clothes Dryer Fires in Residential Buildings, 2008-2010, FEMA/US Fire Administration, NFIRS

Skip Walker is a CREIA Master Inspector, an ASHI Certified Inspector, an ICC Certified Combination Residential Building Inspector, an ICC Certified California Residential Building and Plumbing Inspector and a FIRE Certified Fireplace Inspector. He has presented at a number of local, state regional and national ASHI and CREIA conferences, the National Association of Realtors®, the California Association of Realtors® and the New York City Council Building and Safety Committee on smoke alarm performance and CO poisoning issues. Walker has served in numerous capacities for CREIA and ASHI and written extensively on smoke alarms, CO issues and general inspection issues. He is the recipient of the 2014 ASHI Philip C. Monahan Award, ASHI's highest honor, the 2014 ASHI President's Award, the 2014 CREIA John Daly Award, CREIA's highest honor and the 2011 CREIA Inspector of the Year. Skip is a co-author of the soon to be published CodeCheck 8th Edition. Skip's home has ONLY photoelectric alarms installed. You may reach Skip via email at: skip@cocdecheck.com.

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Stucco – Exterior Insulation and Finish Systems:

A Simple Approach to a Complex Problem

BY ALAN CARSON, CARSON DUNLOP, WWW.CARSONDUNLOP.COM

EIFS, or synthetic stucco, as it is often called, is complicated. In this short discussion we will touch on what it is, what problems it has had, and what home inspectors should watch for.

Note: This article cannot do justice to this topic. Please accept my apologies for all of the omissions and simplifications. We understand there are many variations of both materials and installation methods. We also recognize there is a separate and much more in-depth method for evaluating this cladding system using specialized equipment and invasive testing. Our focus is restricted to the scope of a general home inspection.

WHAT IS SYNTHETIC STUCCO?

It is an exterior wall cladding system from Europe that was first used in North America in the 1960s, and became very popular in housing in the 1990s. Originally used on masonry walls, it became popular on wood frame homes. It was used because of relatively low cost, good insulating levels and architectural flexibility.

While there are many variations, we will look at the most common. These include:

- a sheathing (substrate) such as plywood and OSB (Oriented Strand Board)
- a water resistant barrier (WRB) over the substrate - Optional
- a drainage plane - in newer installations (This may be vertical strips of adhesive over the WRB.)
- insulation board (usually expanded polystyrene) adhered or fastened to the substrate
- a 1⁄16 to 1⁄4-inch thick water resistant base coat (commonly cement mixed with acrylic polymer) troweled on, with a glass fiber reinforcing mesh embedded
- a finish acrylic coat sprayed, troweled or rolled on, which provides the color and texture

WHAT'S IN A NAME?

Synthetic stucco may be called – EIFS, thincoat, softcoat or PB polymer based stucco. Traditional stucco may be called – hardcoat, cement stucco, Portland cement stucco, lime-cement stucco, or thickcoat.

EIFS/SYNTHETIC STUCCO	CONVENTIONAL STUCCO
Insulation board over the substrate	No insulation board
No secondary weather barrier on the exterior of substrate	Building paper or housewrap on the exterior of substrate
Drainage plane on newer systems	No drainage plan
Polymer based cement base coat	Portland cement base coat
Fiberglass fabric mesh reinforcement	Wire lath reinforcement
Thin, flexible acrylic finish coat	Thicker, brittle cement finish coat

HOW IS IT DIFFERENT THAN CONVENTIONAL STUCCO?

It's different in several ways. Here are some:

CONTINUED ON PAGE 10

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PROBLEMS WITH EIFS

Problems in U.S. homes surfaced in the 1990s and included class-action lawsuits. The initial problems were identified in the southeastern United States, but problems have been found throughout North America. These centered around water damage to wood framing members. In some cases significant rot was found within the first year or two after construction.

WHAT HAPPENED?

EIFS over wood frame walls forms a watertight skin on the outside of the building. It's a little bit like putting a building in a plastic bag. The idea is to keep the water out of the building. These systems are referred to as 'barrier' or 'face seal' systems.

WHY DIFFERENT FROM CONVENTIONAL STUCCO?

Synthetic stucco problems develop when water gets into the wall assembly through the skin. This often occurs at joints and penetrations. Once water gets past the skin, it gets trapped in the wall and is unable to escape or dry out. The walls are said to have very low 'drying potential', unlike conventional stucco which is much more porous. Trapped water leads to mold and rot.

Conventional stucco is more porous, as mentioned. Water can move through both in and out. The stucco itself acts as a reservoir. Conventional stucco often has a convenient if unintentional drainage plane at the back of the system. A double layer of building paper for example, forms a great drainage plane.

COMMON PROBLEM AREAS WERE

- Around and below doors and windows
- at wall penetrations for pipes, conduit, vents, electrical fixtures, railings, etc.
- at roof and deck flashings
- ahere EIFS extends below grade
- complex architectural details

Stucco 1: This illustration shows an older system with no water resistant barrier or drainage plane.

Stucco 2: The joint between the synthetic stucco and windows is a vulnerable area. This system appears to be in good condition with a well-caulked joint.

Stucco 3: Workmanship is often an issue, as seen on this windowsill.

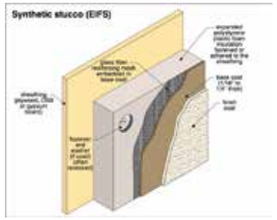
Stucco 4: Here's what it looks like when we open up a wall where the detail work was not so good.

Stucco 5: This conduit passing through the wall is not well sealed.

Stucco 6: Kickout flashings help prevent water from getting behind stucco at the bottom of adjacent roofs.

Stucco 7: There is no kickout flashing on this new home. This is likely to be a problem area.

As problems were recognized, the installation methods changed. A drainage plane was added behind the insulation to allow water to escape by draining down the wall and out through the bottom. This recognized the reality that



Stucco 1


Stucco 2

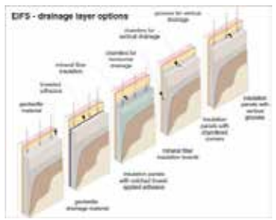

Stucco 3


Stucco 4


Stucco 5

Stucco 6


Stucco 7



Stucco 8

water would probably get through the wall at some point and provided a way to get rid of it.

Stucco 8: This illustration shows a more modern approach with a series of drainage strategies.

Don't bother trying to memorize these assembly details. As home inspectors, we never get to see a cross-section of the wall. We only get to see readily accessible performance issues.

These approaches, introduced around 1997, have not been universally successful and are dependent on good installation techniques and detailing. Vented rain screens using more formal drainage approaches are more successful but not as common in residential construction.

CONTINUED ON PAGE 11

CONTINUED FROM PAGE 10


Stucco 9

Stucco 9: Here we can see the drainage layer behind the stucco. The drip screed/weep screed at the bottom directs water out through the bottom of the wall. Illustration courtesy of STUC-O-FLEX International. In a true vented rain screen, the cavity behind the stucco becomes pressurized by the force of the wind. This reduces the pressure differential across the stuccoand reduces the amount of water driving through the siding. We don't get to see walls and cross section, so you won't often know how the stucco assembly was put together.

IDENTIFYING EIFS

Differentiating hardcoat stucco from synthetic stucco is largely a tactile experience. Tapping and pressing on hardcoat and synthetic stucco yields very different sounds and feels. Tapping on hardcoat stucco feels like tapping on thin concrete. It sounds solid. Tapping on softcoat stucco has more give, and typically yields a hollow sound or very little sound. Tapping on hardcoat stucco with a bare knuckle hurts more than tapping on synthetic stucco. There is no substitute for experience here.

You may be able to see the fiber mesh reinforcement at openings or surfaces, as we saw on the windowsill in the photo above. You may be able to see the wall detail at the bottom with a mirror, for example. You may be able to see the insulation, fiberglass mesh, or the thick roughly 2 inches) wall system projection typical of synthetic stucco. By the way, you should not be able to see the insulation or the mesh.

Intricate architectural stucco details including dentils and quoining are difficult to achieve with hardcoat stucco. These details often indicate synthetic stucco. These complex exterior details are also often problematic.

Note: There are lots of variations and there are always exceptions. There are hybrid systems that have acrylic finish over a hardcoat base. There are walls that are hardcoat stucco walls with the architectural details at the perimeters done in synthetic stucco. If you are not sure, do not guess!

WHAT TO WATCH FOR

Inspecting synthetic stucco walls is tricky, and the home inspection scope wherein we are visually inspecting readily accessible items presents some significant limitations. Damage to wall systems is typically concealed behind the synthetic stucco skin. We look for evidence of distress, and clues that may suggest concealed problems. Here's our top 10 list of things to watch for:

1. Stucco bulges or cracks (often at or near openings due to stress concentration)
2. Dark streaks below the corners of windows, and any dark areas consistent with moisture
3. Loose stucco
4. Mechanical damage
5. Unfinished edges and exposed fiber mesh reinforcement
6. Stucco extending down to or below grade (It should stop at least 6 inches above grade)
7. Missing kickout flashings
8. Poorly installed flashings above door and window openings and at roofs, decks, etc.
9. Poorly sealed openings around doors, windows, pipes, conduits, railing connections, electrical fixtures, etc.
10. Evidence of patching, caulking and other temporary repairs
11. Flat roofs with no overhang (Large overhangs help protect walls)

Problems around windows are more common than any other. Pay close attention around and below windows, inside and out.

It's rarely this dramatic, but watch below windows!

FURTHER INVESTIGATION

Some home inspectors offer stucco evaluation services. This can include inspection with penetrating moisture meters (probe testing), scanning moisture detection devices, infrared thermography, borescopes and so on. There are training programs and protocols that should be considered before offering these. Many inspectors simply recommend further investigation by a specialist for homes with synthetic stucco. Thanks to Roger Hankey and Kevin O'Hornett for their many valuable contributions to this article.

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AFFILIATE MEMBER REIA

MISREADING CUSTOMERS MEANS MISSED SALES

BY JOHN GRAHAM, GRAHAMCOMM

Selling is never easy. Never. But salespeople often make it even tougher for themselves by letting customers get away empty-handed. It isn't that customers don't find what they want or what they're looking for. It's just that they don't want to deal with the salesperson.

With the 800-pound Internet gorilla lurking over every sale, today's customers are much more demanding when dealing with salespeople. If the experience doesn't meet their expectations, they're gone.

More often than not, misreading customers causes them to look elsewhere—missed sales. It doesn't need to happen and here's how to avoid it:

1. Be sure you're speaking with the right "customer." Wrapped up in every customer is a handful of different customers, who behave differently depending on the situation. The first job is figuring out which of these customers you're dealing with at the moment so you can respond correctly. Here they are:

- The "I want to know more" customer. This customer requires patience, so ask clarifying questions and get them talking. Don't push, but gently pull them along until they're comfortable.
- The "I have all the answers" customer. Let this customer talk and tell you all about it; don't cut them off. This person wants to be the salesperson so let them feel they made the buying decision on their own.
- The "I know what I want" customer. By listening carefully to these customers, you may find inconsistencies in their thinking. Then by asking them follow up questions, these customers may recognize that what they thought they wanted was not a good idea after all.
- The "I can't make up my mind" customer. Here, the salesperson becomes a resource, offering options and comparisons and making note of the customer's responses so the person can recognize the best solution.

By making sure you're talking with the right customer, salespeople take a big step toward making the sale rather than losing it.

2. **Think individuals, not groups.** Even though everyone is unique, we lump people into groups—doctors, servers, business owners, blue collar, boomers, Gen Z, old people, Hispanics, and on-and-on. In reality, we know that all Hispanics, accountants, or electricians are not the same. For example, out of the nearly 80 million 18 to 35 year-old Millennials, there's a segment of 6.2 million with an annual family income of $100,000 or more. They're the Affluent Millennials and they're quite different from the other 62 million non-affluent Millennials of the total group.

According to a study, *Money Matters: How Affluent Millennials are Living the Millennial Dream*, this group is in a second phase. "Compared to non-affluent Millennials, affluent Millennials over index when it comes to changing jobs, buying a home, and making home improvements in the last 12 months," and they also "over index when it comes to expecting a child in the next 12 months," states FutureCast, the study sponsor.

It's clearly good to be cautious when making marketing and sales assumptions about any group. Basing decisions on opinion, inaccurate information, or hearsay leads to misreading customers—and missed sales.

3. Don't stop with first impressions. A marketing manager called about meeting to talk about working with his company. After a 400-mile drive, he arrived in a near-ancient pick up truck, wearing ragged jeans, a wrinkled shirt, and dirty boots. There was little doubt about that first impression: the meeting was going to be a waste of time.

Not recognizing it, we instantly pigeonhole customers—and that can be a mistake. First impressions may not tell the whole story. The man in the dirty boots is a good example. He was for real; his company became our largest account.

Never get carried away with first impressions, and be prepared to discard those that don't fit.

4. Always offer options. There's a lot to learn from companies that do a great job capturing customers by offering options. The Honda Accord, for example, comes in several models, each with a basic price: LX, Sport, EX, and EX-L. Choices engage customers so they don't go away.

To be effective, options must be realistic and not so many that they become confusing or frustrating to customers. A financial advisor may present three scenarios for a client's consideration, while a real estate agent may show a client several styles of homes. Options should create discussion and further interaction.

5. Don't tell customers what to think. "Do you love it?" asked the interior decorator after delivering the reupholstered sofa cushions. The couple murmured a few words, "It's bright and different." But at that moment, one thing was certain; they didn't love it.

Far too often, salespeople make the mistake of trying to "guide" customers, tell them what to

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think: "This a great buy." "Isn't this a perfect floor plan for your family?" "Don't you just love the color?" "This is going to look great in your home."

Customers want help and suggestions, but they don't want salespeople telling them what to think. When that happens, it's a turn off.

6. Forget about customer loyalty. It's only human to believe that we have loyal customers. When some leave, we make excuses as to why they left. It's tough seeing customers leave. It's as if they are rejecting us. It negates everything we've done for them. Breaking up is painful, particularly after making customer care a top priority and bending over backwards to satisfy them.

We think that customers show their appreciation by being loyal to a company, brand, or salesperson. However, what we label as loyalty may be something quite different. It may be nothing more than convenience, price, laziness, inertia, or habit. Nothing more.

In other words, customer loyalty is an illusion. It lets us think the interchange with customers should result in their loyalty— and that's a big mistake. Today, nothing—absolutely nothing—stands in the customer's way from getting what the customer wants, the way the customer wants to get it, and where they want to get it.

We misread customers and lose them when we expect their loyalty. Our task is to focus on doing everything possible to give them a great experience. That's the only reward that counts.

Misreading customers' costs sales. To prevent this from happening, it takes doing battle with our assumptions, particularly those that influence how we think about customers and what we expect from them.

John Graham of Graham-Comm is a marketing and sales strategist-consultant and business writer. He publishes a free monthly eBulletin, "No Nonsense Marketing & Sales Ideas." Contact him at jgraham@grahamcomm.com, 617-774-9759 or johnrgraham.com.

JERRY'S CODE CORNER

FORWARD

Way back, CREIA published a monthly magazine called "The Inspector." Each month, I couldn't wait to read "Jerry's Code Corner." Jerry McCarthy wrote that column for over a decade. Think of that, well over 100 articles. Jerry "retired" the column and moved to the California wine country to enjoy his grandkids and wife. When he moved, Jerry cleaned out his office. He called me one day and said, "Skip, I have a bunch of stuff for you. Come by and pick it up!." So I did as I was told. In this mass of information was code and reference books dating back to the 1927 UBC. A treasure trove of inspection reference material.

Every so often my curiosity is piqued, so I open up a book and read. Each time I think of Jerry and how much he gave to all CREIA members. He loved CREIA and all it stands for. Even his license plate read "CREIA ONE." Much of his work was behind the scenes. Most of us have no idea how much Jerry really contributed. But we all have much to be thankful for when it comes to Jerry. His legacy is one of education. He wrote books, worked on the SoP's, contract, taught at conferences, presented at chapter meetings, worked on committees, and answered countless questions on the TIE and in the ASK. CREIA.org sites. You name it, there was little that Jerry didn't touch in this organization. Whether you realize it or not, Jerry has touched almost everyone in this organization.

Jerry was a mentor to many of us. He held all of us to very high standards. I suggest they we do not disappoint him. Somewhere up there, he is watching us. When the time comes, he will be there to meet us with a full accounting of our earthly inspection deeds. Jerry was never known for his diplomacy…

In the midst of all the "stuff" Jerry gave me was a CD with all those years of Code Corner plus many other articles Jerry penned. Jerry is gone now. Bringing back the Code Corner seemed a fitting way to honor Jerry's legacy and allow his memory to live on. I will smooth out the rough edges, update the references to current California Code where needed. My intent here is to not mess with success. Rather, it is to let Jerry's words speak for themselves. So Enjoy!

— Skip Walker, MCI

The Code of Perception

BY JERRY MCCARTHY (PRINTED POSTHUMOUSLY)

Someone once said, "beauty is in the eyes of the beholder." Well I say, "The perception of competence is in the eyes and ears of the home inspector's clients."

Competence equals confidence and without it the show is over before it starts.

The homebuyer's initial perception of their inspector usually sets the tone for the ensuing

CONTINUED ON PAGE 15

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performance. Studies have shown that upon introduction it takes less than two minutes before people reach an opinion about someone that's going to require their total trust Therefore, it follows that your client's perception of you regarding your knowledge, honesty, and ability is tantamount to success or failure in our industry. "Can we trust this person, does he/she know what they are talking about, and will they be thorough" runs through the minds of most homebuyers when first meeting their inspector. Never lose sight of the fact most homebuyers are sinking their life savings into their purchase. You're there to help them make that decision.

Perception can occur almost instantaneously in that personal judgments' are often made by the condition of the inspector's vehicle, their personal appearance, how they're dressed, the assortment of tools they carry, their attitude, and most important, their communication skills. It doesn't matter how experienced or knowledgeable you may be in construction technology or building codes because without excellent communication skills you're in the wrong profession.

Are you on time for your appointment? I was taught early on that if you didn't arrive at least ten minutes early, you were late. I have found this to be generally true of many old timers who have shared with me that they are always early to their inspections. This allows them the time to check the lay of the land, get set up, alert the property owners (contain their pets) and perhaps even complete their roof and chimney inspections before the arrival of their clients.

It's important that you put the homeowner at ease and always treat them with great respect even if they have the manners of goats. If they question you about any of your findings assure them their agent will share a copy of your report with them and if they have any questions they may call you. Believe me, they will call you anyway if the deal goes south and you will be accepted into the illustrious ranks of "deal killers."

How many times have you heard the expression, "Please pardon my messy house?" We don't care about the mess, but we do need to get into the napping baby's room and the owner's friendly pit bull requires to be properly secured.

Trust does not come easily and is very fragile in nature. Telling jokes, complaining about local traffic, sharing your political views, becoming overly familiar, and certainly announcing you just came from the "house from hell" are not wise choices.

Credibility must be carefully nurtured and is fragile at best. If you don't know, the answer to the question is to admit it and then follow with, "I will find out and let you know!" Then be true to your word and do it!

Pay absolute attention to your client's questions ands concerns. Keep focused on the job at hand. If your clients don't follow you every step of the way, and elect to measure for the new couch while your explaining issues in the electrical service panel, be patient.

If the seller decides to join the party and keeps chattering about what a great house they are selling, stop and explain to them that you will continue the inspection so they can have their chat.

When I found my clients were somewhat inattentive I would tell them, "I'll proceed with my inspection, but every now and then we need to have a short private meeting so I can bring you up to speed on what I have found." At the end of each such meeting I would always say, "Everything I just told you will be in my written report. I want to make sure that when you read it, it will be familiar to you."

I always encouraged my clients to ask questions and tried to make them feel part of the inspection process. "Do you have any young children?" I always inquired, not to be nosey. Rather, I wanted to see if I should emphasize hazards that were applicable to small children.

Almost no inspection goes on very long until the, "how much will that cost to fix or replace?" question arises; which is usually followed by, "We won't hold you to that." The best answer is the truth, "I don't know." Anyone who quotes prices, even "ballpark," is asking for trouble. You tell them a new roof should cost about $15,000.00 and later you get a call and are informed their roof cost double that figure. Along with an explanation that they wouldn't have bought if they'd known and by the way, when are you sending a check for the difference?

Remember, the only valid estimate is in written form called a "bid" and submitted by a qualified person who is going to perform the work. (Qualified in inspection industry lingo means: state licensed)

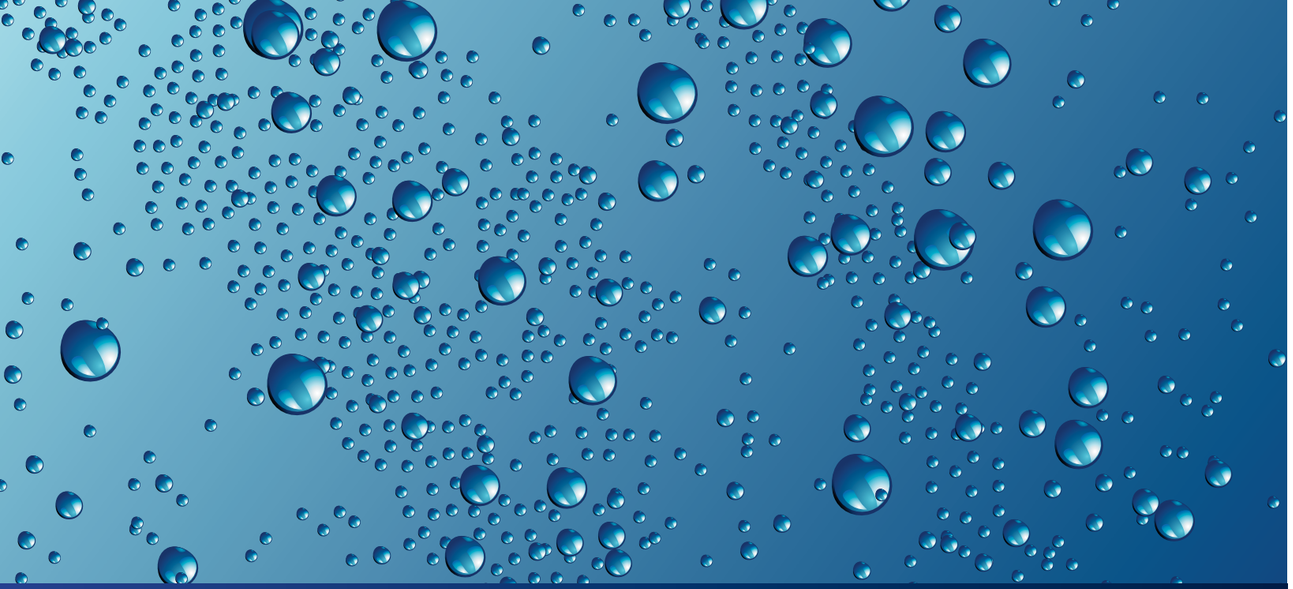
At the conclusion of your inspection a short summary is called for. This should always be arranged in a quiet place site, such as across the street or near your truck. This conference should only include your clients and their legal representative, the agent. If it's a dual agent, so be it.

The very last thing you want to do is to share your findings in front of the homeowners who have long labored under the illusion their home is perfect. When I first got into this profession I had an older agent who invariably would announce, "Jerry, when you're finished I want you to come into the living room and tell us everything that's wrong with the house." Yeah Dorothy, right!

The very last impression you want to give your clients is that there is nothing wrong with the house other than the items in your report. Then later something is discovered that you may have failed to address. A call from a client with questions about your report always beats getting one after the close of escrow from their attorney.

Don't accept refreshments, don't sit down, you're not exactly a welcome guest or a member of the family. Keep everything on a totally professional level. You want to be perceived as a professional to all parties involved in the transfer of property. They are not your friends nor do they want to be. You are a facilitator of information; much of it may be negative. Maintain a professional attitude at all times. Never become unnerved and blow a positive perception that it took you to establish.

A final word about "perception" that has become very true in our society, "perception really does becomes reality."

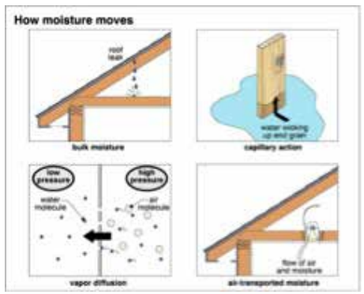


AIR TRANSPORTED MOISTURE – A STEALTHY ENEMY

BY ALAN CARSON, CARSON DUNLOP, WWW.CARSONDUNLOP.COM

Most home inspectors would agree that water is the Number One enemy of homes. We usually think of roof and plumbing leaks, surface water leaking through foundations, etc. This is bulk moisture. It is the most visible of four ways moisture moves through buildings. Let's look at them.

- Bulk moisture – leaks discussed above;
- Capillary action – wicking or rising damp;
- Vapor diffusion – water vapor moves from high to low pressure areas without air movement;
- Air-transported moisture – water vapor carried by the air.



Bulk moisture is the most visible and significant source of water damage in houses. Air transported moisture is second. Vapor diffusion and capillary action are relatively minor issues. Let's look at air-transported moisture.

- Air can move freely between indoors and outdoors through doors and windows;
- Air leaves houses through chimneys and vents for wood stoves, fireplaces, furnaces, boilers and water heaters;
- Air leaves the house through clothes dryer vents, bathroom exhaust fans and kitchen exhaust fans;
- Air leaks out of and into homes as a result of stack effect;
- Wind can cause air to be blown into a house on the windward side and drawn from the house on the leeward side.

Some of these are obvious, but some warrant a little discussion.

In a nutshell, warm, moist air that leaks into walls condenses as it cools, trapping water in the wall which leads to mold and rot. Let's make sure we understand what's happening so we know what to look for during inspections.

HOW DOES MOISTURE GET INTO THE AIR?

Air is able to hold moisture as a vapor. Moisture in the air comes from –

- humidifiers - often set improperly, adding too much moisture to air in cold weather
- people washing their face and hands and brushing their teeth
- showers and baths
- cooking and washing dishes
- washing clothes
- washing floors, walls and furniture
- watering plants
- people breathing and perspiring
- damp soil in subgrade spaces (crawlspaces)
- firewood (one cord can release one gallon of water per day as it dries)
- pets

CONTINUED ON PAGE 17

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A family of four can generate 10 to 12 gallons of water a week through their normal household activities. Humidifiers can add considerably more. Unprotected soil in a crawlspace can contribute 10 gallons a day!

HOW MUCH WATER CAN AIR HOLD?

We describe the amount of water in the air as either absolute or relative humidity.

ABSOLUTE HUMIDITY

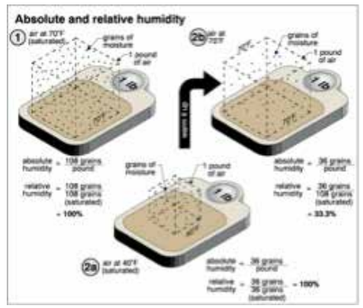
Absolute humidity is the actual amount of moisture in the air. This can be measured in grains (0.002285 ounces) of moisture per pound of dry air. For example, 70°F saturated air contains 108 grains of moisture per pound of dry air. The term saturated refers to the amount of moisture air can hold without forming condensation. If more moisture is added or the temperature drops, we will get rain or condensation.

SATURATION LEVELS CHANGE

Air can hold more moisture at higher temperatures. A pound of 70°F air can hold 108 grains of moisture. The same air at 40°F can only hold 36 grains. As air warms up, it can hold more moisture. As air cools down, it's able to hold less moisture. Condensation forms when air is cooled.

RELATIVE HUMIDITY

Relative humidity (RH) is the amount of moisture in the air relative to how much moisture the air could hold if saturated. Air at 40°F can hold 36 grains of moisture per pound of dry air. That air is at 100% relative humidity. If the air is warmed to 70°F, it still has 36 grains of moisture, but its relative humidity drops to 33% because 70°F air can hold 108 grains of moisture (36/108 = 33%). The dew point is the temperature for air of a given relative humidity below which condensation occurs.



Here's where it gets interesting! Air at 70°F can hold twice as much moisture as air at 50°F. If we cool a sample of air at 70°F with 50% relative humidity to 50°F, the relative humidity rises to 100%. If the temperature falls to 49°F, we get condensation. And that can be a problem...

SUMMARY

Cold air can hold very little moisture. Warm air can hold a lot of moisture. Cooling the air causes condensation. The more moisture it has, the less it has to cool to condense.

HOW MUCH HUMIDITY?

People are comfortable with humidity in the range of 30% to 50% RH. When it's freezing outside, buildings prefer <15% RH to avoid condensation, mold and rot. People usually get their way.

WHAT DOES IT ALL MEAN?

The air in a home at 70°F and 40% RH will be saturated if it cools to 45°F. Condensation will form in the winter when warm, moist house air leaks into cold wall or roof spaces. The outside wall temperature will be close to the outdoor temperature. As air leaks through the wall or roof, it will cool and the water vapor will condense inside the wall/roof assembly. This can lead to water damage, mold and rot inside the wall assembly. This can go unnoticed for some time, until considerable damage occurs.

The water damage, mold and rot inside of this exterior wall assembly was a result of the extreme moisture from an indoor pool that was not properly managed – This structure had to be torn down.

HOW DO WE PREVENT CONDENSATION?

We can reduce the indoor humidity, but people are not comfortable with that. We try to stop the air leaking into wall assemblies with drywall, polyethylene air/vapor barriers, building wrap, foam insulation, etc., but perfection is hard to achieve. Air barriers that are 99% effective are not effective at all, in the same way that balloons with a tiny hole won't hold air.

Another strategy is to let the air escape quickly outdoors before it can condense. Attic ventilation is a good example. Breathable exterior siding (wood, vinyl & aluminum siding) is more forgiving than barrier systems like stucco and EIFS. It's risky to rely on this approach, although it was very effective in older homes with air-leaky, poorly insulated walls. The walls were warmer and the air escaped more easily than in today's tight, energy efficient construction.

WHAT DO WE WATCH FOR?

Damage in walls can be difficult to identify until the damage is extensive. Moisture runs down, collecting on sill plates inside the wall. There may be visible evidence of water at baseboards and quarter round. Moisture meters and infrared cameras can help identify concealed water problems.

Problems are typically worse on upper floors due to stack effect. Warm air rises and exerts more pressure on upper walls, resulting in air moving into wall assemblies.

Staining on siding indicating severe condensation - Photo courtesy of Roger Hankey

Condensation on windows is an indicator of possible problems and a clue to look further, although there are many variables.

Water damage and rot on the interior sill of this window as a result of condensation – a common occurrence with single pane or poorly insulated glazing combined with high interior humidity levels.

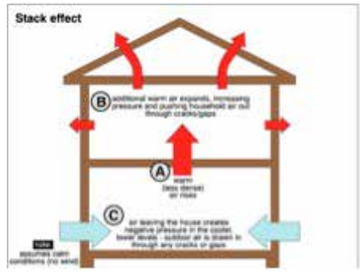
STACK EFFECT

Stack effect in a building is fairly simple. Warm air is lighter than cool air because it is less dense. The warm air rises and expands,

CONTINUED ON PAGE 18

CONTINUED FROM PAGE 17

creating a higher pressure near the top of the house. This relatively high pressure air tries to get out of the house through any cracks or holes it can find. The cooler, lower pressure air near the bottom of the house allows outdoor air in through cracks and holes.



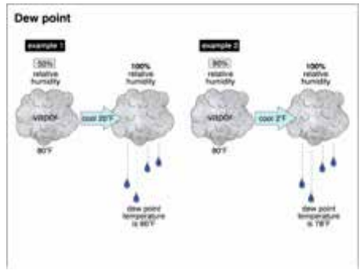
NEUTRAL PRESSURE PLANE

In the top part of a building there is positive pressure relative to the outdoor air pressure. In the lower part of the house, there is negative pressure relative to the outdoor air pressure. At some point in the house, there is a level where the pressure is neither positive nor negative. This is referred to as the neutral pressure plane. The neutral pressure plane on a calm day in an average house might be a little more than halfway up the house. However, there are many things that can change the location of the neutral pressure plane. This is important because warm, moist air leaking out through the walls is more likely to damage a home than cold, dry air leaking in through the walls.

DEW POINT

We talked about air being saturated with moisture when the relative humidity is 100%. For any bundle of air, the dew point temperature is the temperature at which condensation will just start to occur. It is just another way of saying the humidity level is 100%.

Many people think of the dew point as a cold temperature. This isn't necessarily so. Air at 80°F and 50% RH has a dew point of 60°F. If the outdoor temperature is 80°F and the humidity is 90%, the dew point is 78°F. The dew point can be at any temperature. Any bundle of air that is almost saturated has to cool only slightly to produce condensation.

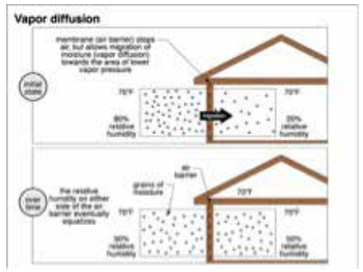


VAPOR DIFFUSION

Vapor diffusion is the movement of vapor without air movement. Many materials allow moisture through without allowing air through. Human skin is one good example. A good quality windbreaker is another. These materials are designed to stop the flow of air, but still breathe. It's important for clothing because we want to be able to get rid of the moisture that evaporates off our skin, but we don't want to be exposed to the direct effect of the wind. The people who make Gortex® have been very successful at developing products that do exactly this. Housewraps do not allow air through, but do allow moisture through.

VAPOR PRESSURE

Water vapor will move from an area of high vapor pressure to an area of low vapor pressure. A house at 70°F and 35% relative humidity has roughly ten times the vapor pressure in the air as outdoor air at 0°F and 75% relative humidity. (There's more moisture in the 70°F air even though the relative humidity is lower.) Moisture will move as a result of the vapor pressure difference from indoors toward outdoors.



PUTTING IT IN PERSPECTIVE

The movement of air in and out of buildings is about a hundred times more important than vapor diffusion. For practical purposes, we can ignore vapor diffusion. **Vapor retarders aren't very important. Air barriers are important.**

THE PROBLEM WITH MOISTURE

INTERSTITIAL CONDENSATION

We've been talking about moisture condensing in building components as warm, moist air that cools on its way out of the building. This is sometimes called **interstitial condensation**. This causes –

- rotting wood;
- expanding and shrinking wood due to changes in moisture content;
- rusting steel;
- spalling concrete and masonry (with freezing);
- reduced thermal resistance of insulation materials (may be temporary).

It's easy to see why we don't want condensation accumulating in roofs and walls.

MOISTURE GETS STORED

Some building materials like wood are hygroscopic. This means they have fairly large surface pores and are able to absorb considerable amounts of water. Organic insulations, such as cellulose fiber and wood shavings or sawdust, are also hygroscopic. So is wood framing materials, sheathing and siding, for example. Materials like steel, glass, fiberglass and mineral wool are not hygroscopic. Hygroscopic building materials are able to absorb moisture and store it during wet periods. As the air dries (as temperatures increase), the building materials will dry out. There is a limit to how much moisture can be stored. Wood, for example, is able to safely store up to twenty percent moisture by weight. Moisture levels above this can cause rot.

DRYING POTENTIAL

Some buildings are able to dry faster than others. Where air can move freely through attics or between siding and sheathing, moisture can be flushed into the outdoor air during periods of low relative humidity. Wall assemblies with wood shingles and shakes, conventional wood siding, and aluminum and vinyl siding have fairly good **drying potential**. Materials like stucco and EIFS (Exterior Insulation and Finishing Systems) do not have good drying potential. This can have an effect on whether (and how much) damage is done to structures due to trapped moisture.

Thanks to Roger Hankey for his significant contributions.

MAKING MORE MONEY
BY PROVIDING HOME ENERGY SCORES

BY DOMINIC MARICIC, CEO,
HOME INSPECTOR PRO – HOME INSPECTION SOFTWARE,
WWW.HOMEINSPECTORPRO.COM

Home Energy Score assessments are going prime time. They are simple to perform and a great way to increase your bottom line. The question is, are you ready? As you read this article, keep in mind what adding this specialized skill to your toolkit could mean for your business—for both pre-listing and listing inspections and as a unique selling point to enhance your marketing strategies.

Home Energy Scores are a rating system created by the US Department of Energy (DOE). The simplest way to describe the Home Energy Score program is to compare it with the familiar miles per gallon (MPG) rating for cars, which was developed by DOE's Environmental Protection Agency. The Home Energy Score is intended to be an easy to understand, national standard that will motivate homeowners and buyers to invest in energy efficiency in a similar way to how the MPG rating encourages buyers to purchase cars that are more energy efficient. Everyone can understand a simple rating scale of 1 to 10, with 10 being the most energy efficient of homes. And, just like with cars, the DOE wants every house to be scored.

The DOE started testing their Home Energy Score program in 2011. Ten agencies across the United States ran the program to help test and refine it before going public in 2012. During that first year, 4,000 Home Energy Scores were generated. As of the beginning of 2016, over 32,000 homes had been scored. With 5.25 million homes sold in 2015, though, it's obvious that most homes have not yet been scored. One of the main reasons for this is the incentive to pay someone, such as a home inspector; to perform the Home Energy Score test just wasn't there.

Several recent developments have caused things to change, however. In September 2015, the

CONTINUED ON PAGE 20

InspecTest

This series of columns is designed to familiarize CREIA members with "The Glossary Project" which is "Standardized Terminology for the Professional Real Estate Inspector." This is a must have for all inspectors and is especially helpful in preparing the associate for the NHIE and CREIA SOP/Ethics examinations most of the terms in the test are defined in The Glossary Project, which is available in the CREIA Online Store.

1. The amount of electrical current a device or piece of electrical equipment can safely carry is its _____.
2. A circuit breaker that is similar to a GFCI in looks and operation except the it detects potentially dangerous arcing on the circuit rather than ground faults is an _____.
3. A depressed angle formed where two roof planes meet at an inside corner is the _____.
4. A flat area of pavement of varying shape or size is a _____.
5. A pipe used for conveying rainwater, surface water, condensate, cooling water or a similar liquid waste is a _____.
6. A current-carrying conductor in a circuit that is connected to the service neutral is a _____.
7. A non-current carrying conductor that provides an alternate path to the system ground is a(n) _____.
8. A type of insulation, vaguely resembling wool that is blown into the space to be insulated is called _____.
9. A short, vertical, framed wall between the foundation sill plate and floor joists is a _____.
10. A device designed to perform a specific function, which utilizes fuel such as a water heater, oven, furnace, etc. is a(n) _____.

ANSWERS:
1. Ampere Rating 2. AFCI (Arc-Fault Circuit Interrupter) 3. Valley 4. Slab 5. Storm Sewer, or Storm Drain 6. Grounded Conductor 7. Grounding Conductor 8. Rock Wool 9. Cripple Wall 10. Appliance

CONTINUED FROM PAGE 19

US Department of Housing and Urban Development's Federal Housing Administration (FHA) announced a new policy. Under this new policy, a homebuyer receiving an FHA loan can receive thousands of dollars in additional funds added to their mortgage. If a home receives a Home Energy Score of 6 or higher, the buyer's lender can provide a 2% stretch on the debt-to-income ratio during the purchase or the refinance of a home. If a home receives a Home Energy Score below 6, the buyer can receive funds to help bring the house up to the level of a 6 or higher. The goal of these incentives is to increase the energy efficiency of homes in the United States by rewarding the owners of homes that are already scoring well in the hopes that the owners will spend their savings on making more energy improvements to their home and by helping owners of homes that aren't up to the ideal score to finance energy efficient improvements in those homes. (You can read more about the FHA's partnership with Home Energy Score program at http://goo.gl/idTqMp.1)

Another big change that has occurred recently is the acceptance of the Home Energy Score rating by multiple listing services (MLS). The DOE's Real Estate Standards Organization (RESO) and the Council of MLSs are working together to provide energy information to all buyers. This partnership means that Home Energy Scores will start appearing on MLS data sheets and on sites like Realtor.com, Zillow, and others. Currently, five regions—in the Northeast, Washington, DC (MRIS), Chicagoland (MRED), Boulder, CO (IRES) and Portland, OR—are leading the way. The rest of the MLS areas have agreed to incorporate Home Energy Scores by 2018. Many areas are already in the process of programming in the scores. (You can read more about the MLS and Home Energy Scores at http://goo.gl/2r1BL1.2)

The last major change that's occurring is the acceptance and expansion of the program among states and cities. Colorado, for example, will give homeowners $750 for each point that they improve their Home Energy Score, up to a max of $3,000, or four points. In addition, Connecticut, Vermont, Oregon, Missouri, Alabama and others are working with the DOE to create combined state-federal programs and energy recommendations. The city of Berkeley, California, has become the first city to mandate that a Home Energy Score be acquired for all real estate sales with many others now in the process of setting up the same requirements.

BECOMING A HOME ENERGY SCORE ASSESSOR

There are not many statements you can make when speaking with prospective clients that will show that you're more qualified than saying that you are certified by the US Department of Energy. So how do you get certified?

First, the DOE requires all inspectors to be a member of an official organization. In the home inspection industry, ASHI, BPI, CREIA, and InterNACHI all qualify (and are all listed on the DOE Website). You also need to be affiliated with a DOE partner. CREIA is in the process of partnering with the DOE. I will be giving a talk on Home Energy Scores at the September 2016 and during the May 4-7, 2017 CREIA Annual Conference in Burlingame.

Once you choose your partner organization, you will be required to complete its specific program. To begin this process, you'll contact the organization's designated Home Energy Score representative who can direct you to the online courses you'll need to complete to become a Home Energy Inspector (these will likely be available on the organization's website).

Once you've completed the requirements of your DOE affiliate partner, you'll be directed to the DOE website. The DOE website offers online training that includes using a 3-D simulation tool, and you'll take the practical and written test online.

ENTERING THE DATA AND GENERATING REPORTS

Although there are a few software programs outside our industry that you can use to generate the report, the main methods currently available within the home inspection industry are via the DOE website and by using Home Inspector Pro. Last year Home Inspector Pro became the first home inspection software company to partner with the DOE, and integrate Home Energy Scoring into their software.

During the inspection, you'll collect data on approximately 40 items, almost all of which you normally would collect during your home inspection process. These items include the type of HVAC system and water heater units in the home (and when they were manufactured) and information about the home's roofs, foundations, walls and windows. The only equipment required that you may not already own is a measuring wheel, which you'll use to measure the perimeter of the house. The total additional time needed to collect the Home Energy Score data and enter the information into the program is approximately 20 to 30 minutes.

After you've entered all the data, you'll electronically send the information to the DOE. Within a minute, the DOE software will automatically generate and send a PDF of the information back to you. The Home Energy Score program does not require mandatory reporting—this means that your client can choose whether or not to send the Home Energy Score information to his or her lender.

READING THE REPORT

The Home Energy Score report contains 5 pages. Page 1 shows the home's score on a rating scale of 1 to 10. Pages 2 through 4 show the information that you collected in an easy-to-read format. Page 5 shows the items that are recommended for "Repair Now" or "Replace Later."

Items listed in the "Repair Now" category are repairs for which the homeowner could recuperate the costs within 10 years. Items under the "Replace Later" category are repairs that could take longer to recuperate the costs. Having a list of these items is useful to homeowners because they already may be planning to make specific changes to the home, and they may want to know that an item, such as their home's HVAC unit, is already near the end of its life.

CALLING ALL HOME INSPECTORS

I hope that the information provided in this article has helped you to see what's happening and what's likely to happen in the realm of Home Energy Scores. If you're still wondering whether becoming an inspector who can conduct Home Energy Scores would be beneficial to your business today, think about this: Can you imagine going to a car dealership to buy a car and then even considering a car that doesn't have a MPG sticker on it? Of course not. So, as more and more Home Energy Scores start showing up on MLS listings, there will be a tipping point at which buyers will begin to demand this information. Will you be in the group of inspectors who led the way in performing Home Energy Score assessments? Will you be the first to teach a class at your local real estate agent's office? Or will you sit on the sidelines and wait to see what happens?

1. *Glickman J. DOE's Home Energy Score and FHA Mortgages: New Tools to Help You Shop for and Buy an Energy Efficient House.* Posted January 14, 2016. Better Buildings, US Department of Energy. Available at: http://betterbuildingssolutioncenter.energy.gov/beat-blog/doe%E2%80%99s-home-energy-score-and-fha-mortgages-new-tools-help-you-shop-and-buy-energy-efficient. Accessed July 25, 2016.
2. *Crawford J. Home Energy Efficiency Information: Coming to Your MLS by 2018.* Posted January 5, 2016. Better Buildings, US Department of Energy. Available at: http://betterbuildingssolutioncenter.energy.gov/beat-blog/home-energy-efficiency-information-coming-your-mls-2018. Accessed July 25, 2016.

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Dominic Maricic is the CEO of Home Inspector Pro, Inspection Software & Website Hosting and a CREIA Affiliate Member. He has spent the last few years working with the Department of Energy to bring Home Energy Scores into the hands of home inspectors via Home Inspector Pro. Dominic has given several talks with the Department of Energy and will be giving another joint talk with the DOE in May 2017 at CREIA's Annual Conference and a solo presentation on the topic during the September CREIA Conference.

If you have any questions on this topic, please contact Dominic Maricic, CEO of Home Inspector Pro, at Dominic@HomeInspectorPro.com.

INSPECTOR TIP

I carry a 24-foot extension ladder on the rack on my truck, but when you get up to 40 mph, it starts to howl like blowing on the tops of a hundred bottles... So bad that people can't hear me on my speakerphone. So what I did is filled all of the rung openings with expandable foam. This is cheap, easy and completely stopped the noise problem.

— Ken Collins

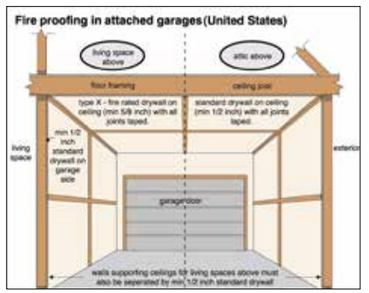
Fireproofing or Gas-proofing in Attached Garages

BY ALAN CARSON

Attached garages pose a fire hazard to houses. They also pose a life safety hazard in that the exhaust fumes from automobiles are toxic, usually containing carbon monoxide. Building authorities call for fire- or gas-proofing of garage/house walls, depending on your area. Fireproofing of walls and ceilings is required in the United States. In Canada, gas-proofing is called for on walls and ceilings of garages attached to single-family homes.

CEILINGS SOMETIMES

Ceilings only have to be dealt with if there is living space above, or if fumes could enter living spaces from above the garage ceiling. You should be familiar with what your local building authorities require.



ACHIEVING REQUIRED SEPARATIONS

If a one-hour fire rating is called for, it can be achieved several different ways. Find out what the authorities will accept in your area and how most builders accomplish it. Are concrete block walls required between garages and houses? Are wood-frame walls allowed? What sort of drywall treatment is necessary to get the required fire rating? Is fire-rated drywall typical? Do drywall joints have to be taped? Are non-combustible studs used? How are ceilings with living space above handled? Is the required fire rating the same? How is it typically achieved?

INEFFECTIVE FIRE- OR GAS-PROOFING MAY EXIST BECAUSE OF –

- poor design or construction practices originally (including missing components or inappropriate materials)
- mechanical damage (often a result of vehicle impact in garages)
- moisture damage

Compromised fire- or gas-proofing is a life safety issue. A fire in the garage may spread to the house, or toxic fumes from automobile exhaust may enter the living quarters.

Penetration through garage enclosure such as a central vacuum system shown here can compromise the fire- and gas- proofing of the garage.

As you go into the garage, be clear as to exactly what parts of the garage connect to living space. Is it one wall, two walls, three walls? Is it all or part of the ceiling? Look for areas where the tightness of the wall may have been breached or where inappropriate materials have been used.

DUCTWORK

Be careful if there is ductwork from a forced-air system passing through the garage. There

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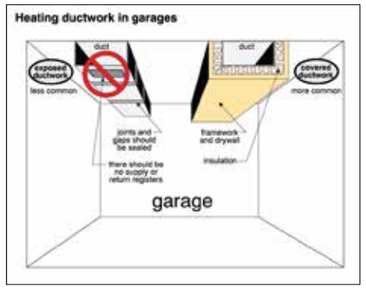
should be no gaps in the ductwork where automobile fumes could enter the house, and there should be no supply or return registers. You might find this occasionally where someone is simultaneously using the garage for their vehicle as well as a workshop. Although it's a clever way to condition the space while they are working there, it's a safety hazard, since deadly exhaust fumes from vehicles can enter the house. Additionally, any ductwork passing through garages should be insulated to the level required in your area.

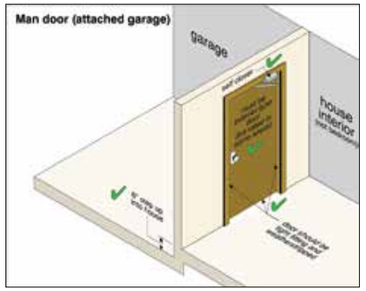


Look carefully inside garages for any supply or return registers – especially where it appears the garage is being used as a workspace.

MAN DOOR IN ATTACHED GARAGES

Tight Fitting Fire Door With Self Closer And Six-Inch Threshold

Doors between the house and garage may breach the fire rating or gas tightness if not of a proper type and not properly installed. The doors should be tight fitting and weather-stripped, and most jurisdictions require that a self closer be provided. A 6-inch step up from the garage floor to the door threshold is good practice.



EXTERIOR GRADE DOORS

There may be security issues with respect to man doors. They should be at least exterior-type doors, if not fire-rated. They should be fire-rated if the garage/house wall has to be fireproof.

NOT ALLOWED?

Some municipalities believe that doors directly from garages into homes can allow toxic gases and/or fire into homes. These communities don't allow doors between garages and houses.

The common problems with man doors between garages and houses include –

1. door not fire rated or exterior type, as required
2. door not tight fitting and weather-stripped
3. no self closer
4. no 6-inch step up into the house

These problems may be the result of -

- an original construction problem
- modifications by owners
- mechanical damage
- lack of maintenance

Implications are a possibility of fire or toxic fumes entering the house is a concern with all of these problems.

Where a fire-rated door is needed, look for a rating plate on the edge of the door or frame. Test the door operation. Open the door and let go. Does the door close securely by itself? Look for gaps around the door. Does it fit tightly? Look for a six-inch step up from the garage into the house. Where it is not present, look for evidence of moisture damage around the door threshold on the inside. Some communities do not allow man doors to connect the house and garage directly. Find out what is permitted in the areas you'll be working in.

Here's a man door leading from the attached garage inside the house with an ineffective self-closer

EXPOSED COMBUSTIBLE INSULATION IN GARAGES

Combustible plastic insulation is a severe fire hazard. Plastic burns hot and quickly, giving off a thick toxic smoke. Many jurisdictions do not allow exposed combustible insulation in living spaces or garages.

Plastic insulation should not be exposed in garages. Efforts to lower energy costs and improve building comfort result in the installation of plastic board insulation. In many cases, homeowners turn their garage into a workshop, and attempt to make it either warmer in the winter or cooler in the summer by insulating it with foam insulation and leaving it exposed.

This insulation contributes tremendous fuel to a fire and can make the difference between a controlled fire and a complete loss. Where plastic insulation is noted in a garage, recommend that it be removed or covered with a noncombustible material. Even drywalling over it is a significant improvement, but find out what complies with the rules in your area.

Here's some exposed foam insulation inside an attached garage that should be covered with drywall

We have quickly introduced three very important aspects of safety for attached garages that you should be looking for when inspecting a house.

Sump Pump and Sewage Ejector Requirements Refresher

BY BY MICHAEL CASEY, MCI, ACI, MICHAEL CASEY & ASSOCIATES
WWW.MICHAELCASEY.COM, CREIA PREMIER EDUCATIONAL AFFILIATE

I've been seeing many more sump pumps and sewage ejectors lately and thought a reminder on the requirements might help us all.

SUMP PUMPS

Sump pumps are found occasionally under houses or in closets. These are also called dewatering pumps as they are designed to remove ground or rainwater (not grey water or sewage). Often they are an indicator of a fundamental drainage problem that needs to be addressed and the pump is merely treating the symptom. Lately I am seeing more of them outside houses under drain grates where the grade is below the street, and the pump is to remove roof water and surface water up to the street via an underground drain. Sometimes the pump discharges to an onsite retention area, with an overflow to handle water should it become full.

Here's a list of the items I look for when I see a sump pump, some are required, some not. I'm sure I'll forget a few things so don't consider this a complete list. First, is the sump in the lowest spot and or do the drainpipes feeding it look satisfactory to fulfill the intended purpose. Sometimes the pump is just tossed in a ditch; I would recommend a permanent sump to help prevent pump damage from dirt and rocks. The electric receptacle should be GFCI protected and extension cords to power the pump are not a good idea.

Sump pump at exterior, note high water level alarm float at discharge

Exterior sump pump drainage grate cover

Next, I look for proper discharge; minimum size should be 1.5 inches. Some of the flexible hose kits are 1.25 inches diameter and not really the required minimum. Generally, there should be a check valve on the discharge rather close to the pump to prevent pipe water from running back into the sump and short cycling the pump. Most jurisdictions do not allow sump pumps to discharge into the sewer, I like to see the discharge terminate at least 5-feet from the house, the farther the better. If you live in an area where the discharge could freeze consideration should be given to prevention of this condition.

The sump itself should have a cover so nothing can fall into the sump, it should be sealed if in a radon area. Outside pumps usually have a heavy drain grate covering them. The float should operate smoothly and not rub pipes or the sump walls. If possible, I'll test the pump, but always alert my clients to do so periodically, and if I did not test it. When the sump pump is critical (very few are prophylactic) I will always recommend a high water level alarm. Even better is a battery backup pump. Often power fails during a thunderstorm, when you'll really need the pump to work.

SEWAGE EJECTORS

Sewage ejectors are similar to sump pumps, however, handle waste and sewage water so the pump will be more robust and be a grinder type to churn waste into a stew that can be pumped in a relatively small pipe. Only fixtures below the main building drain are allowed to drain into the sewage ejector sump; often I see other fixtures connected, often to the vent.

Sometimes the sewage ejector will handle the entire house. Usually these are outside, have dual alternating pumps and are most often called a lift station.

Sewage ejector sumps should always have a sealed cover. I do not open them to inspect the inside, and let my clients know this in the report. I do run fixtures to obtain activation from the pump so I can listen to it and observe for any leaks.

Sewage ejector in basement closet. Note check valve at discharge and shutoff

Sewage ejectors should have two pipes exiting the top. Both are generally 2-inch diameter, although some can be 1.5-inch pipe. One of these pipes is the vent for the sump; since water raises and lowers in the sump this vent must connect to the sump cover, and connect to an existing dry vent or terminate outside itself. AAVs and mechanical vents are not allowed for venting sewage ejectors.

The other pipe is the pump discharge. Shortly after penetrating the cover there should be a check valve installed in the discharge pipe. Above the check valve should be a full-way shutoff valve (usually a ball or gate valve). This shutoff is required and is important to the person who is retained to replace the check valve and or disconnect piping to work on the pump.

CONTINUED ON PAGE 26

BEFORE YOU BEGIN...

BY LARRY AGUILAR, MCI, INSPECTOR FELLOW

We use the Standards Of Practice (SOP) to guide us as we perform an inspection. Consider that there is also important information that can be gathered prior to arriving at the inspection site. The information we get from the Realtor or client may be incomplete or not fully accurate. So a cursory check of the available information can be a good idea.

The first step should include looking up the property on the Internet to verify square footage, age, number of bedroom and bathrooms, and other pertinent information. Then, bring up the address using Google Earth. Google Earth offers a way of viewing the property historically. The historical view can include a number of years. If you click on the "tour guide" (white arrow) icon at the lower-left corner, the program shows a slider at the upper, left- hand corner (red arrow) that allows you to see previous years photographs of the same area. Hopefully there is a number of years that have been cached.

Using this procedure can determine when and if additions have been made. It can also give you an idea if the property is smaller or larger than you have been told. This can be very helpful in accurately quoting the home inspection fee (if your fee scale is based on square footage). Sometimes non-permitted additions have been made that add to the original footprint of the building that the client may want to be inspected.

For instance, I once had an inspection where the Realtor told me that the property was 800 square feet and I gave him the fee for that size property. When I arrived it turned out to be 1500 square feet! I revised my fee and informed the Realtor before I started the inspection. He then told me that the addition was not documented and thus could not be advertised as such; which should have been conveyed when the inspection was ordered.

Neighborhood information is also helpful. As you are driving to the property, note if there are any new roofs in the neighborhood. Knowing the age of the property can provide some good information. Let's say that the property is ten years old and it has a new roof... Do you think that that might be something worth exploring? There might be attic ventilation or installation issues. If you can ask the owner, there may be a valid and believable answer. Be aware of the average life spans of the different types of roofing provides valuable information.

Note the condition of the flat work including the driveway and sidewalk. New sidewalks and driveways can be a source of information. A big pile of dirt in the middle of the front yard can be an indication of a tree that has been removed. What would you think the condition of the sewer lateral might be? If this is the case then you should recommend a sewer lateral test. Note if the trees have shallow or surface roots that might affect the condition of the flat work. Note if any new concrete work has been performed. Note if the property is on a hillside.

All of this information and more can be gleaned from other sources and can allow you to understand some of the items that you note during your inspection. Speaking to seasoned inspectors will also help you determine what other avenues of information are available.

By Larry Aguilar, MCI, IF, CREIA Certified Trainer and Mechanical Engineer
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CONTINUED FROM PAGE 25

Shutoff valve on wrong side of check valve. Photo courtesy of Dream Home Consultants used with permission. For more see EverybodysBuildingCode.com

The discharge pipe should be traced if possible to be sure it actually connects to the building sewer (I've seen a few go outside to the back slope) and that the connection occurs above the centerline of the drain. Best is connection to the top with a Y fitting.

Although not required, I recommend a high-level alarm and power outage alarm if none are installed for sewage ejectors. The electric receptacle should be GFCI protected.

High water level alarm with battery backup. Connects to a float in the sump.

Often I see the bolts for the sewage ejector cover in a pile in the corner. Of course the cover is no longer sealed and sanitary, however, the bigger clue is the pump is most likely chronically problematic. I'd suggest inquiry with the occupant as to past issues and performance of this system and further evaluation by a licensed plumber.

I hope this short article helps you and thanks for reading!

Michael Casey, MCI, ACI, CNCS, is principal of Michael Casey & Associates, a national A.M. Best recommended consulting firm based in San Diego. Mike is past president of the California Real Estate Inspection Association (1994-1995) and of the American Society of Home Inspectors (2002).

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MAY 4-7, 2017

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Planning for the 2017 Conference is underway.
Members of CREIA's 2017 Annual Conference Committee
have been working hard to plan a conference that will result
in creating more business opportunities for members
and providing rich educational opportunities
from respected and knowledgeable presenters!

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May 4-7, 2017 for CREIA's 2017 Annual Conference.

AIR BARRIERS VERSUS VAPOR BARRIERS

BY ALAN CARSON, CARSON DUNLOP, WWW.CARSONDUNLOP.COM

While we often use the same material to act as both an air barrier and a vapor barrier, the functions are different.

The content described here is under the assumption that we are trying to heat the space. In climates like California where cooling is more important, keep in mind the warm, moist air we're trying to stop is on the outside, rather than the inside. The function of air barriers is the same; the only thing that changes from heating to cooling climates is the direction of movement that causes the problem. In a heating climate, we don't want the warm, moist air to leak into and through the walls to the outside. In a cooling climate, we don't want the warm, moist outdoor air to leak into and through the walls to the inside.

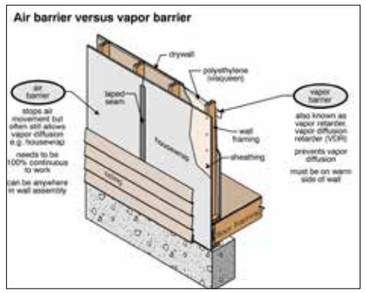
FUNCTION OF AIR BARRIERS

Air barriers are designed to stop air movement through the building walls and roof. There are two reasons this is important:

- Air carries heat. We want to minimize the flow of building heat to the outdoors.
- Air carries moisture. This moisture may be deposited in the building structure as it cools and condenses. This can cause damage to the building.

FUNCTION OF VAPOR BARRIERS

A vapor barrier, vapor retarder or vapor diffusion retarder (VDR) is designed to protect the building from moisture damage. A VDR minimizes (but does not completely stop) the diffusion of vapor from inside the house to the wall or roof cavity. Remember that no air movement is necessary for vapor diffusion to take place. We also said that air leakage is roughly one hundred times more important than vapor diffusion, with respect to moisture damage to buildings.



As you can see, a vapor diffusion retarder has fewer functions and is less critical than an air barrier. Let's look at air barriers first.

QUALITIES OF A GOOD AIR BARRIER

These are qualities of a good air barrier:

- Stops air movement.
- Durable, ideally lasting the life of the building.
- Strong, and either rigid or well enough supported to stay in place.
- Continuous. A bucket that is missing one percent of its bottom cannot do its job. Similarly, an air barrier that is 99 percent intact cannot do its job.
- Inexpensive.
- Resistant to moisture, rot and chemicals.

WHAT MAKES UP THE AIR BARRIER?

In a typical home, the air barrier may be thought of as a system, rather than a single component. Many people think only of polyethylene film as an air barrier. People don't usually think of windows as air barriers, but they are. So are drywall, plaster, doors, caulking, weather stripping and many other building materials.

POLYETHYLENE

Polyethylene film is often installed as an air barrier because it is more continuous than other building components. However, polyethylene film is often not continuous, because of a number of factors, including –

- poorly sealed joints;
- discontinuities in the film at partitions, wall/ceiling intersections, wall/floor intersections, door and window openings, etc.; and
- plumbing, electrical and heating penetrations.

HOW DO WE KNOW AIR BARRIERS ARE NOT EFFECTIVE?

If the air barrier were completely effective, there would be less need to ventilate roof spaces. Attic ventilation wouldn't be needed in heating climates because there would be no warm, moist air to be flushed out of the building before it condensed. Exterior siding materials would not have to breathe to allow moist air leaking into the wall spaces from inside the house to escape outdoors. We'd have no rot damage to structures caused by condensation, at least in heating climates.

NEVER PERFECT

Even people who pay considerable attention to effective air sealing of homes have been less than completely successful. Wherever high indoor air pressure pushes air against wall and roof cavities, the air will find a way in.

INSULATION AS AN AIR BARRIER!

Some insulations work very well as air barriers. Most of the rigid board insulations, for example, are effective air barriers, if their joints are taped, caulked or protected by gaskets. Foamed-in-place insulations are good air barriers. Some loose-fill insulations act as a decent air barrier. Cellulose fiber, in particular, installed at the appropriate densities, can greatly restrict air movement through walls and roofs.

INSULATION BETTER THAN CAULKING!

Surprisingly, some studies have shown that, while fairly extensive air sealing efforts with caulking did not dramatically reduce the air leakage of a building, blowing loose-fill cellulose fiber insulation into wall cavities did dramatically reduce air leakage. That's because air sealing can only address the problems that are accessible. There are many gaps in buildings through walls and roofs that are not visible or accessible.

COMMON MATERIALS

CONTINUED ON PAGE 29

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Common air barrier materials include polyethylene film and housewraps. We'll look at those first, and then look at several other materials that act as part of the air barrier system in a house, sometimes by accident.

Polyethylene – Polyethylene sheets have traditionally been provided on the inside face of wall studs and on the underside of ceilings, immediately behind the plaster or drywall. Polyethylene film is light and inexpensive to work with. It is also a vapor barrier.

Housewraps – Housewraps are typically spun-bonded polyolefin or polypropylene fabrics. These are good air barriers but are not vapor barriers. You can think of them as a windbreaker.

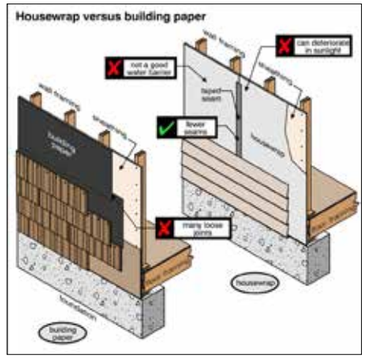
They will allow vapor diffusion readily, but will not allow wind to blow through them.

Foam insulation boards – Most of the foam insulation boards, including polystyrene, polyurethane, isocyanurate and phenolic board, are good air barriers as long as their seams are sealed with tape, caulking or gaskets. These are typically installed on the outside of a building.

Drywall, plaster and wood paneling – Most interior wall and ceiling finishes are effective air barriers, but there are many gaps at the edges and penetrations through the finishes. Conventional wisdom has suggested we cannot rely on these systems as air barriers.

Sheathing – We've talked about plywood and OSB sheathings. We've explained how they are usually not effective air barriers because of the intentional gaps at the joints. Lumber sheathing is not an effective air or vapor barrier because of the large number of unsealed joints.

Building paper – Building paper does not perform well as an air barrier because of the many loose joints in a typical building paper application.



Although building paper can be used as an air, it is often ineffective because of loose joints

Other common air barrier materials include:

- gaskets
- Gaskets for electrical boxes and plastic enclosures around electrical boxes
- Backer Rods
- Caulking and Weather Stripping
- Polyurethane foams
- Duct Tape and Duct Mastic

VAPOR BARRIERS

Vapor barriers, vapor retarders or vapor diffusion retarders (VDRs), have a different function than air barriers, although the same materials are sometimes used for both. Let's look at the properties of a good vapor barrier:

- Vapor-diffusion resistant
- Durable
- Moisture and rot resistant
- Chemically inert
- Inexpensive

VAPOR BARRIER DEFINED

How do we know if a material is a vapor barrier? Vapor barriers are described by their permeance. The unit of permeance is the perm. The lower the perms, the more effective the vapor barrier. Unfortunately, there are metric and imperial perms. An imperial perm is the number of grains of water that will move through one square foot of material in one hour, under a pressure difference of one inch of mercury. One grain is 0.002285 ounces.

METRIC PERM

A metric perm is the number of nanograms of water that will pass through one square meter of material per second, under a pressure difference of one pascal. A nanogram is one one-billionth of a gram.

VAPOR BARRIER HAS PERM LESS THAN 1.0

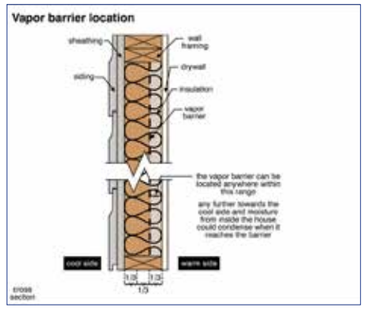
Generally speaking, a material is considered a vapor barrier or vapor diffusion retarder if its perm rating is less than 1.0 (imperial) or 57.5 (metric).

CONTINUITY NOT CRITICAL

Vapor barriers do not have to be continuous to be effective. A vapor barrier is not like a bucket with one percent of its bottom missing; a vapor barrier with one percent of its material missing will still be 99 percent effective. Vapor diffusion is a function of the surface area across which the water molecules can move. If we block most of the surface area, we'll stop most of the vapor diffusion. Again, this is different from an air barrier.

MUST BE ON THE WARM SIDE

Vapor barriers must be on the warm side of the wall to perform their function. We said that air barriers could be on the warm side, in the middle, or on the cool side of a wall assembly. A vapor retarder must be on the warm side. If the water molecules are allowed to move into a cool space, they are likely to condense. A vapor retarder on the outside will not protect the wall from moisture damage due to vapor diffusion.



WITHIN THE WARM THIRD

There is a widely quoted rule that says vapor barriers don't have to be at the warm face of the insulation. They can be a third of the way through the insulation, closer to the warm side. The research that this rule is based on is a 1950s study of questionable authority, but the rule has been relied on without serious trouble for a long time. It seems to work.

DRYING POTENTIAL

There's another reason we don't want a vapor barrier on the exterior of a wall in a cold climate. Most wall systems are less than perfect at keeping rain and snow from getting into the wall from outside, and keeping warm, moist air from getting into the wall from indoors. Building materials such as wood will store a certain amount of moisture without causing damage. When the outdoor temperatures rise and relative humidities drop, building

CONTINUED ON PAGE 30

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materials typically dry to the outside. If there were an exterior vapor barrier, this drying potential would be greatly reduced. Breathable exterior components on wall assemblies prevent water damage by allowing good drying to the outdoors.

DON'T WANT TWO VAPOR BARRIERS

Consider a wall with a vapor barrier on the inside surface. Can we have a second vapor barrier on the exterior surface? No. Vapor barriers are not likely to be 100 percent effective. We don't want to allow moisture to get into the wall cavity, and then trap it there. We want to allow that moisture to move out through the wall to the outdoors. Any vapor that leaks past the internal vapor barrier should be allowed to flush itself out to the exterior.

COMMON VAPOR BARRIER MATERIALS

Let's look at some of the materials that are commonly used as vapor barriers.

Polyethylene film (visqueen) – This is probably the most common material used as a vapor barrier. As we discussed, it's typically also used as an air barrier, immediately behind the drywall in wall and ceiling assemblies.

Kraft paper – Old fiberglass and mineral wool insulation batts were often faced with brown kraft paper, which is a vapor barrier.

Aluminum foil – This vapor barrier may also be used as a radiant barrier to reflect heat.

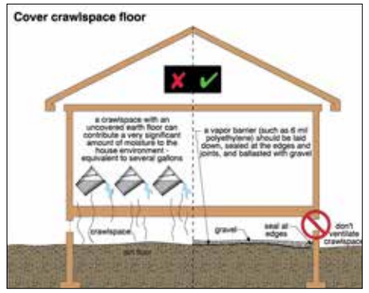
Oil-based paints and vapor-retardant paints – Many paints act as vapor barriers. Latex paints generally do not, unless they are specially formulated to act this way. Varnishes and shellacs also act as vapor barriers.

Insulations – Some insulation materials act as vapor barriers. This includes polyethylene and polyisocyanurate boards. Expanded and extruded polystyrene boards can also act as vapor barriers if they are thick enough. The same is true of foamed-in-place polyurethane and isocyanates.

Vinyl wallpaper – Vinyl wallpapers make quite good vapor barriers. This is unfortunate for people in hot climates who don't want vapor barriers on the interior of their wall assemblies.

Plywood and OSB sheathings – While these materials may or may not be quite vapor barriers in the true sense of the word, they do have fairly low perm ratings. They are almost vapor barriers.

Damaged polyethylene film such as this is an ineffective vapor barrier, and an even more ineffective air barrier



Here's a poorly installed vapor barrier on the ceiling of the crawlspace instead of the floor where it should be located.

VAPOR BARRIERS ON CRAWLSPACE FLOORS

We've been talking about vapor barriers that separate the living space from the outdoors. There's another place where vapor barriers are extremely important. Houses that have crawlspaces with earth floors can suffer considerable moisture damage. A typical earth floor in a crawlspace can add much more water to a home than an average family. Several gallons of moisture vapor can be added to the house air every day!

COVER THE FLOOR

If the sub-grade area has a concrete floor, there is very little problem. If the floor is unfinished earth, we recommend a vapor barrier such as 6 mil polyethylene. This makes a tremendous difference if it is sealed at joints and around the edges and covered with gravel to keep it in place. The several gallons of water that find their way from the soil into the house air every day will be eliminated. Home inspectors commonly find serious rot in wood framing members in crawlspaces with earth floors. It's one good reason to make the effort to get into crawlspaces.

TOILET SETTING

BY LARRY AGUILAR, MCI, INSPECTOR FELLOW

The parameters for toilet setting are well defined in the 2013 CPC section 402.5 Setting Fixtures. Fixtures shall be set level and in proper alignment with reference to walls. No water closet or bidet shall be set closer than 15 inches from its center to a side wall or obstruction, nor closer than 30 inches center to center to a similar fixture.

How many times have you actually measured the setting? I began measuring settings when I worked for a litigation firm documenting new construction defects. Part of their process was to measure every setting at every inspection because they found that the condition was violated often enough to warrant concern.

Sure enough, I found that about one out of 15 houses in new construction violated the standard. The litigation firm instructed me to measure not only the space allotted (30 inches or more) but also distances to walls and cabinets (15 inches or more).

For some reason the builders paid more attention to the 24-inch front clearance than the side-to-side clearance. The condition can arise also when the owner replaces a cabinet with a bigger cabinet because the family wants more countertop space.

Since the lawyers wanted to know who was responsible for the condition, I was asked to measure the space allotted as well as the center to wall distance. The lawyers wanted to know if the framer allotted enough space or the plumber placed the toilet in the wrong place. If you begin measuring these distances, I'll bet that you will find the setting condition more often than you would think.

This begs the question: "How far does a setting have to be off of the ideal setting to make a difference?" Certainly, ¼ inch is well within the measurement accuracy of a quick tape measure. Three to four inches is too much and how about that toilet paper dispenser occupying 5 to 6 inches of that space?

When an average sized person cannot sit without hitting the cabinet or wall with an elbow or arm, this may be of concern depending on the size of the people purchasing the home.

The other consideration is "now that you have called it what does one do?" I phrase the remediation in my inspection reports as: "when major work is performed, the condition should be corrected."

In the short term, a new and smaller cabinet can be part of the solution. In any case, this type of condition can be fodder for the basis of a lawsuit claiming that the occupants cannot use the facility properly.

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Insulation Materials for Home Inspectors

BY ALAN CARSON, CARSON DUNLOP, WWW.CARSONDUNLOP.COM

FUNCTION

The purpose of insulation is to slow the rate of heat transfer. This is true in both hot and cold climates. In cold climates, we are trying to stop the flow of heat out of the building. In hot climates, we are trying to slow the movement of heat into the building. Fortunately, insulation works in both directions. For the many climates in North America that need heating and cooling at different times of the year, insulation serves both functions.

INSULATION DOESN'T STOP HEAT

We should emphasize again that insulation only slows the movement of heat. It does not stop it altogether. We should also remind ourselves that it really isn't the insulation material that stops most of the heat. The trapped air pockets within the insulation do most of the work. The solid material of the insulation does reduce direct radiation. Conduction and convection are controlled by the still air.

CHARACTERISTICS

The ideal insulation material would have the following characteristics:

- High resistance to heat flow (a high R-value)
- Inexpensive
- Durable (lasts the life of the home)
- Completely fills cavities
- Air barrier (stops air leaks)
- Vapor barrier (stops vapor diffusion)
- Moisture and rot resistant (because all houses eventually leak)
- Non-combustible
- Chemically inert

Not surprisingly, no insulation meets all these criteria.

MEASURING INSULATION

We have already discussed that the resistance to thermal conductivity is referred to as an R-value. The metric equivalent to this is RSI. To convert from R to RSI, multiply the R by 0.1761. To convert from RSI to R, multiply the RSI by 5.679.

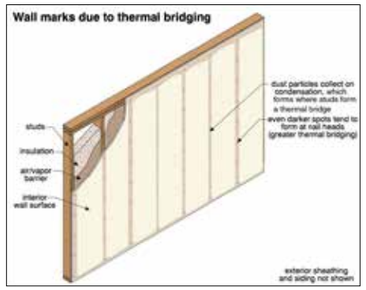
- RSI = R x 0.1761
- R = RSI x 5.679

ALL MATERIALS ADD TO R-VALUE

The insulation value of walls is more than the value of the insulation itself. All materials have some insulating value, including the plaster or drywall, polyethylene air/vapor barrier, wood sheathing, building paper, siding and the air films. However, the majority of the R-value of the wall is attributable to the insulation.

THERMAL BRIDGES

Thermal bridges occur at studs, top plates, sill plates, etc. These are points where the insulation is not continuous. Solid, high-density materials like wood studs conduct heat readily though walls. That's why these are called thermal bridges.

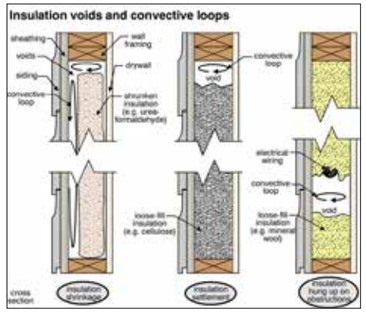


WALL MARKS DUE TO BRIDGING

Thermal bridges not only cause heat loss, but can lead to localized cool temperatures on interior surfaces. Cool interior surfaces can result in surface condensation. The moisture on the surface attracts dust particles and, over a period of years, will create a permanent pattern on the wall. You may have seen dirt marks on walls in older houses that have not been painted for a long time. Very often, these dirt marks follow the pattern of the wall studs. In other cases, they may follow the wood lath. The dark spots are typically the areas where thermal bridging has resulted in cool interior surfaces and localized condensation on the plaster surface.

INSULATION VOIDS AND CONVECTIVE LOOPS

Gaps in insulation can dramatically reduce the R-value of a wall assembly. If insulation batts do not completely fill stud cavities side to side and top to bottom, convective loops can be established as the air moves freely through the stud cavity. Voids can allow a great deal of heat through the wall. It is important that voids are filled. Mineral wool and fiberglass batts can lose up to 30 percent of their R-value if there is 4 percent gap in the insulation, measured over the exposed, insulated surface.



Loose-fill insulation that is blown or poured in can also settle, creating voids at tops of wall cavities, for example. Where insulation is poured or blown into wall cavities, voids may develop if the insulation gets hung up on obstructions partway down the cavity. Voids may also develop in insulations that shrink. Urea-formaldehyde foam insulation sometimes shrank dramatically after it was installed, reducing its R-value.

HEAT LOSS THROUGH AIR MOVEMENT

Insulation is not typically designed to prevent heat loss from air leakage. Air sealing, including caulking and weather-stripping, reduces air leakage.

FORMS OF INSULATION

Insulation typically takes one of four forms:

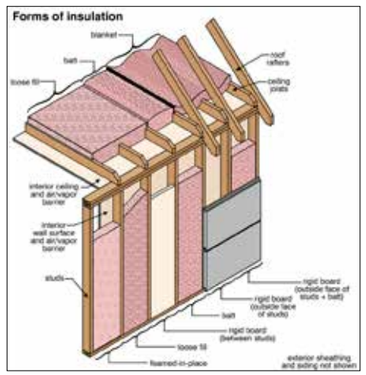
1. Loose fill. Loose fill, which can be blown or poured, is common in roofs and walls. Materials such as cellulose fiber, glass fiber, mineral wool, vermiculite and perlite have all been commonly used. Other materials may also be found, including sawdust, wood shavings, shaved leather, asbestos and gypsum slag.

CONTINUED ON PAGE 33

CONTINUED FROM PAGE 32

2. Batts or blankets. Fiberglass and mineral wool commonly come in batts or blankets. Batts are typically 12 to 24 inches wide and fit between ceiling joists, rafters and wall studs. Blankets can be up to six feet wide and are typically laid over ceiling joists.
3. Rigid boards. Rigid board insulation can be fit between studs or on the outer face of studs, replacing exterior sheathing. Common board insulations include fiberglass, expanded polystyrene, extruded polystyrene, polyurethane and polyisocyanurate. These materials are often faced with housewrap-type products, kraft paper, asphalt-impregnated kraft paper or aluminum foil. Some of these materials have very high R-values.
4. Foamed-in-place insulations. Foamed-in-place insulations are becoming more popular. They include polyurethane and polyisocyanate. Notice it's similar to the word polyisocyanurate, but we left out the "ur" on purpose.

Foamed-in place insulation commonly used to increase R-value



COMMON INSULATION MATERIALS AND THEIR PROPERTIES

We've talked about some of the desirable features of insulation materials. The chart sets out the properties of various insulating materials. Some of the information in the chart has been approximated and there are exceptions to these numbers. We understand there are variances with each material, depending on density and other factors, but this is a broad guideline.

Now let's look at some of the insulation materials.

FIBERGLASS

Fiberglass is a commonly used, versatile, inexpensive insulation. The glass itself is not combustible, although the binders used in it may be. Fiberglass may have an air/vapor retarder fixed to the surface. This may be kraft paper, foil, vinyl or a housewrap.

Loose fill fiberglass commonly used in attics

SKIN AND LUNG IRRITANT

We encourage home inspectors to wear masks and goggles in attic areas because many of the insulations are dusty, and touching and inhaling the fibers is not good for you. HEPA (High Efficiency Particulate Arresting) or P100-type filters are appropriate for masks. We also encourage wearing gloves and long sleeves when moving through insulation. Fiberglass is an irritant to both skin and lungs. There have been some questions raised about the long-term health effects of exposure to fiberglass. There isn't much evidence that occupants of a typical home will have a problem.

R-VALUES VARY

Fiberglass is often blown in as a loose-fill insulation. There are a couple of ways that the blown-in insulation is made, and the densities can vary dramatically. Consequently, the R-values of loose-fill fiberglass insulation can range from the low 2s to the mid 3s per inch.

MINERAL WOOL

Mineral wool insulation is very similar to fiberglass. It is made with slag or rock spun into wool. It is typically treated with oil to reduce the dust, and with binders to hold it together. It is non-combustible, water-resistant, rot resistant and inexpensive.

CELLULOSE

Cellulose is shredded newspaper, chemically treated to resist fire, rot and fungus and to prevent corrosion when wet. Cellulose is denser and is a better air barrier than fiberglass. Cellulose is less susceptible to wind washing and convective air movement through the insulation itself.

Blown-in cellulose also a common material

ABSORBS WATER

Cellulose insulation absorbs water readily. This reduces its insulation value in the short term and tends to compress the insulation, reducing its R-value over the long term, after it has dried.

COMBUSTIBILITY

Because cellulose is made from wood fibers, it is inherently combustible. The fire-retardant chemicals are generally considered effective, although there is some recent evidence these chemicals are applied with varying levels of success. The effectiveness of the chemicals may diminish over time. There is also some evidence that water in the insulation can eliminate the fire retardants.

VERMICULITE OR PERLITE

Vermiculite is expanded mica, and perlite is a rock similar to granite. Perlite, when expanded, takes on a popcorn-like appearance. Vermiculite, when expanded, becomes small, light cubes.

HEAVY AND EXPENSIVE

As insulation materials, vermiculite and perlite are relatively heavy. They are also relatively expensive. Vermiculite will absorb water unless it is treated with an asphalt coating to prevent moisture absorption.

NON-COMBUSTIBLE

Vermiculite and perlite are not combustible unless treated. They are typically only used as a poured loose-fill insulation. They aren't common in new construction.

CONTINUED ON PAGE 34

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Vermiculite insulation commonly used in attics

POLYSTYRENE

Polystyrene insulation is a combustible plastic. It comes in two common forms:

- Expanded polystyrene or beadboard is made by compressing small beads of plastic together to form a board. It is typically white and has a makeup similar to foam coffee cups.
- Extruded polystyrene is a closed-cell insulation material. The beadboard has balls of foam surrounded by air. Extruded polystyrene has balls of air surrounded by foam.

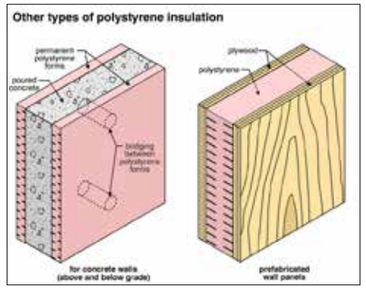
EXTRUDED IS BETTER

Extruded polystyrene traps the air better, and therefore is a slightly more effective insulation. Its R-value per inch is roughly 5.0. The R-value of expanded polystyrene is typically 4.0 per inch. There are different densities of polystyrene available, and insulation levels vary.

CONCRETE FORMS

Polystyrene may also be used as permanent forms for poured concrete, both above

and below grade. This provides a concrete wall with good insulating value.



PHENOLIC BOARD

Phenolic board insulation is an expensive material with a very high R-value per inch. The surface is often coated with kraft paper or foil. Phenolic board insulation is vapor permeable, so it isn't a vapor barrier. It does prevent air movement if the joints are taped.

ONLY SLIGHTLY COMBUSTIBLE

Phenolic board insulation is less combustible than other plastic insulations such as polyurethane and polyisocyanurate. When phenolic insulation is exposed to water, there is some suspicion that corrosive acids may form, which can corrode metal. This is a topic of some controversy in commercial roofing, where phenolic board insulation was used extensively on metal roof decks.

POLYURETHANE AND ISOCYANURATE BOARDS

These are closed-cell foams with refrigerant gases (fluorocarbons) used in the bubbles instead of air. These are typically boards and are often foil-finished on one or both sides. These are expensive insulations, usually used where a high R-value is important and space is limited.

FOAMED-IN-PLACE POLYURETHANE

Polyurethane can be foamed in place. This material expands dramatically when foamed, and cannot be used in closed cavities. It is susceptible to deterioration by sunlight and is very combustible. The material has to be covered. The R-value of foamed in-place insulations is often said to deteriorate over time.

FOAMED-IN-PLACE POLYISOCYANATE OR POLYICYNENE

These foamed-in-place plastic insulations have carbon dioxide as the blowing agent.

Again, they can't be used in closed cavities, although they are often used in new construction in wall and floor cavities, before interior or exterior finishes are applied.

AIR BARRIERS

All of the foamed-in-place insulations make good air barriers, and, in adequate thicknesses, also perform as vapor barriers. These materials are generally combustible and, up to a point, resist moisture damage.

UREA-FORMALDEHYDE FOAM INSULATION (UFFI)

This type of insulation deserves special attention, because it has been controversial.

What is Urea-formaldehyde foam insulation, or UFFI (pronounced "you-fee"), was a UFFI? Common retrofit insulation in the 1970s. It was typically injected as a mixture of urea-formaldehyde resin, an acidic foaming agent, and a propellant such as air. It was typically used in existing houses, most often injected into wood frame wall cavities, or other areas where installation of conventional insulation was impractical.

Holes in the wall may have been used to insert UFFI insulation in this brick home

UFFI has been studied extensively and there is no evidence of any health issues.

From a real estate value standpoint, UFFI may have an impact in your working area; however, our research has not convinced us of any reason a homeowner should have any UFFI-related health concerns.

CHAPTER LEADERS:

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1. Log onto the CREIA Website with your Username and Password.
2. You will land in the "Member Center" (note in the Quick Links area, there is a form called "CEC Submission Form," which can be used to upload your CECs into your member profile).
3. To view your CECs in your member profile: From the Member Center (if you venture away from the Member Center, you can return by hovering over "Members" on the main menu bar and clicking on "Member Center") click on "Update Your Profile" next to the "Hello my name is" section, hover your cursor over "My Profile" and click on "View Transactions." Here you can view CEC reports have been submitted as well as other CREIA events or forms you completed.

SPOTLIGHT ON CREIA AFFILIATE MEMBERS:

ANCILLARY SERVICES

Always Sparkling Pool & Spa Inspections – Over 10 years experience, knowledge, & training in the pool & spa industry. Very detailed, thorough and informative close of escrow pool and spa inspections. Cost estimates for corrections are included. We'll also review the basics of how to use the pool and/or spa with the buyer, if desired. Quality, very friendly & courteous! Kelly Halley is the only female specialty pool inspector in California. Contact 619-840-1879 or alwayssparkling@aol.com

ASI Hastings Heating & Air – ASI Heating and Air Conditioning has been serving the San Diego area since 1952, one satisfied customer at a time. We welcome a message from you if you would like additional information on our products or services, a suggestion about how we may better serve you, or to use any of our online scheduling. Contact: Mike Plavan at 619-590-9300 or mplavan@asiheatingandair.com

Ed Daher Plastering Forensic Stucco Consultant – 41 years of hands-on experience. Stucco Contractor for 36 years. Assisted the CSLB with their Lath and Plaster C-35 exam questions. Contact Ed Daher at 760-727-3390 or eddaher@cox.net

English Pool Consulting – My specialties are: Swimming Pool Construction Defects – Solar Pool heating – Swimming Pool service – Swimming Pool Safety. Here are just a few reasons to consider me in your next case involving pools, spas or solar heating: Swimming Pool Industry professional since 1977. 2000 pools constructed. Bachelors and Masters degrees in engineering. Excellent verbal and writing skills. Over 30 years college level teaching experience. Qualified as an expert in Arizona, California, Colorado, Idaho, Kansas, Nevada, New Hampshire, New Jersey, New Mexico, Texas and Washington. Excellent references. Contact Rick English at 619-338-9197 or rick@english.net

Flood Pro – For over 25 years, Flood Pro has been servicing the Water Damage/Mold Industry. As a full-service General Contractor, we use the most sophisticated drying and repair techniques to get your home back to normal quickly. Flood Pro offers services in mold remediation, sewage cleanup, water damage restoration, and all repairs. In most cases, we can even save your wood floors! One company, many solutions! Contact John Aponte at 949-632-5182 or japonte@ocfloodpro.com

Green Home Solutions of San Mateo - Contact Jose Ramirez at 650-422-3666 Ext 103 or jose@ghsnorcal.com

Green Home Solutions of East Bay. Contact Howard Oliver at 510-666-6711 or howard@ghsnorcal.com

John White Sewer Line Video Inspections – John White Certified Sewer Line Video Inspection is a leader in the optical inspection of sewer line systems. We are certified experts using the best video and fiber optics equipment on the market. We are also very long on experience, and yet old-fashioned in ways that bring added value to our customers. We serve all of the greater southern California areas. Contact: John White at 310-397-5076 or john@sewervideo.com

Private Eyes Engineers – Private Eyes Engineers is a leading forensic engineering company. We specialize in the performance assessment of existing buildings or properties to identify the existence of a defect or shortcoming and/or distress in the subsurface soil, slopes, grading, foundation, and/or structural systems. They offer a 25% discount to CREIA members and their families! Contact Massood Gaskari, P.E. at 760-599-8566 or mg@peengineers.com

Synergy Pool & Spa Inspections – Trust in Synergy. Decades of experience. Knowledge of the latest systems and trends. Excellent communication services. Guaranteed in receiving the best support available in reporting that will assist you in your decisions. Contact John Groth at 760-415-2113 or john@poolandspainspections.com

The Permit Pro Consultant – Drafting and Permit Process for Residential New Construction and As-Builts. Contact Ian Scattergood at 619-579-0088 or ian@permitprosd.com

The Sewer Pro – The Sewer Pros specializes in providing quality cost effective solutions to all phases of sewer inspection and sewer cleaning. Our inspection reports are second to none in the industry and are emailed to your clients within hours of the inspection. The reports include a full written summary with recommendations, digital photos, and full color videos that can be viewed right from the email. Realtors love our detailed reports because they get them right away and they can be easily forwarded to anyone to view. Give us a call for your next sewer lateral inspection and see for yourself why our reports and customer service is the best in the industry! Contact Rick Coffman at 858-257-2888 or rick@thesewerpros.com

THANK YOU TO THE CREIA AFFILIATE MEMBERS!

For more information on the CREIA Affiliate members, please go to the CREIA Website at www.creia.org and click on the CREIA Affiliate Directory icon.

ASSOCIATION AND ORGANIZATIONS

American Society of Home Inspectors
www.homeinspector.org

International Code Council (ICC)

North American Deck and Railing Association
www.nadra.org

Vanguard Emergency Management
www.vanguardem.com/his

BUSINESS SERVICES

Arrow Pipeline Repair, Inc.
www.arrowpipeline.com

OneSource Solutions
www.osconnects.com

TWM Roofing, Inc.
www.roofingsince1978.com

EDUCATION AND TRAINING PROVIDERS

Carson Dunlop & Associates Ltd
www.carsondunlop.com

Home Inspection University
www.homeinspectionuniversity.com

IAPMO
iapmo.org

Insepction Certification Associates (ICA)
www.icaschool.com

McKissock 100% Education
www.mckissock.com

Michael Casey & Associates
www.michaelcasey.com

Monroe Infrared Technology
www.monroeinfrared.com

OnCourse Real Estate, Inc.
dba American Home Inspectors Training
www.ahit.com

PRO-LAB
www.reliablelab.com

Professional Home Inspection Institute
www.homeinspectioninstitute.com

ENVIRONMENTAL TESTING SERVICES

Hovey Environmental
www.hoveyenvironmental.com

Knight Environmental Consulting
www.knightenvironmentalconsulting.com

Radalink, Inc. www.radalink.com

FRANCHISES & MULTI-INSPECTOR NETWORKS

DeBerry Inspection Services
www.deberryinspections.com

US Inspect www.usinspect.com

INSPECTION REPORTING PRODUCTS & SYSTEMS

3D Inspection Systems, Inc
www.3dinspection.com

Home Inspection Form
www.homeinspectionform.com

Home Inspector Pro
www.homeinspectorpro.com

HomeGauge www.homeguage.com

HomeHubZone www.homehudzone.com

Imfuna www.imfuna.com

Spectacular Home Inspection System
www.spectacularhis.com

INSURANCE

Allen Insurance Group, Inc.
www.allenins.com/commercial-products/coverage-for-specific-industries/home-inspectors-insurance

Capstone Partners Financial and Insurance Services, LLC

Citadel Insurance Services
www.inspectorproinsurance.com

InspectorPRO Insurance
www.inspectorproinsurance.com

OREP Insurance www.orep.org

OTHER ANCILLARY SERVICES

Always Sparkling Pool & Spa Inspections
www.AlwaysSparklingPoolAndSpa.com

ASI Hastings Heating & Air
www.asiheatingandair.com

Ed Daher Plastering Forensic Stucco Consultant

English Pool Consulting

Green Home Solutions of East Bay
www.greenhomesolutions.com

Green Home Solutions of San Mateo
www.greenhomesolutions.com

Flood Pro ocfloodpro.com

John White Sewer Line Video Inspections
SewerVideo.com

Life Deck www.lifedeck.com

Private Eyes Engineers
www.peengineers.com

Synergy Pool & Spa Inspections
www.poolandspainspections.com

The Permit Pro Consultant
www.permitprosd.com

The Sewer Pros
www.thesewerprossd.com

TOOLS & EQUIPMENT

LiftMaster www.liftmaster.com

INSPECTOR JOURNAL

A PUBLICATION OF THE CALIFORNIA REAL ESTATE INSPECTION ASSOCIATION

ATTENTION MEMBERS:

If you have editorial ideas or would like to submit an article for Inspector Journal, please do so at anytime to the CREIA office at ceo@creia.org.

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CHAPTER CALENDAR 2016

FOR MORE INFORMATION GO TO WWW.CREIA.ORG AND CLICK ON UPCOMING EVENTS!

DELTA CHAPTER
2nd Wednesday of each month 6:00 pm
CK Grill and Bar, 14725 Harlan Rd, Lathrop, CA 95330

GOLDEN GATE CHAPTER
1st Tuesday of each month 6:00 pm
Buttercup Grill & Bar,
660 Ygnacio Valley Rd., Walnut Creek, CA 95496

GREATER SACRAMENTO CHAPTER
3rd Wednesday of the each month 6:00 pm
Sam's Hof Brau, 2500 Watt Ave., Sacramento, CA 95821

GREATER SAN GABRIEL VALLEY CHAPTER
2nd Tuesday of each month 5:00 pm
Zapata Vive, 101 S. 1st Ave., Arcadia, CA 91006

INLAND EMPIRE CHAPTER
3rd Wednesday of each month 6:00 pm
Carrows,
11669 E. Foothill Blvd., Rancho Cucamonga, CA 91730

KERN COUNTY CHAPTER
3rd Thursday of each month 6:00 pm
Casa Munoz Restaurant
Corner of E. 18th Street & Union Ave., Bakersfield, CA 93305

LA MID-VALLEY CHAPTER
1st Wednesday of each month 6:00 pm
Alcapulco Restaurant, 722 N Pacific Ave, Glendale, CA 91203

LA/VENTURA CHAPTER
3rd Thursday of each month 6:00 pm
Knights of Columbus Hall #3601
21433 Strathern Street, Canoga Park, CA 91304

LA WEST/SOUTH BAY CHAPTER
3rd Wednesday of each month 5:00 pm
The Lakes Golf Course
400 S. Sepulveda Blvd., El Segundo, CA 90245

NORTH BAY CHAPTER
Last Wednesday of each month 6:30 pm
McIness Golf Center
350 Smith Ranch Road, San Rafael, CA 94903

NORTH SAN DIEGO/TEMECULA VALLEY CHAPTER
2nd Thursday of each month 5:30 pm
Castle Creek Golf Course
8797 Circle R Drive, Escondido, CA 92026

ORANGE COUNTY CHAPTER
3rd Monday of each month 5:30 pm
The Hometown Buffet
1008 East 17th Street, Santa Ana, CA 92704

PALM SPRINGS CHAPTER
3rd Thursday of each month 6:00 pm
Coco's Diner, 78375 Varner Road, Palm Desert, CA 92211

SAN DIEGO CHAPTER
1st Tuesday of each month 5:15 pm
Elijah's Restaurant
7061 Clairemont Mesa Blve. #210, San Diego, CA 92111

SAN FRANCISCO PENINSULA CHAPTER
4th Tuesday of each month 5:45 pm
Mimi's Cafe, Bridgepoint Shopping Center
2208 Bridgepoint Pkwy., San Mateo, CA 94404

SAN JOAQUIN VALLEY CHAPTER
3rd Wednesday of each month 7:00 pm
Yosemite Falls Café, 5123 N. Blackstone Ave, Fresno, CA 93710

SAN LUIS OBISPO CHAPTER
3rd Tuesday of each month 6:00 pm
Margie's Diner, 1575 Calle Joaquin, San Luis Obispo, CA 93405

SHASTA/CASCADE CHAPTER
1st Tuesday of each month 5:00 pm
Sailing Board Restaurant
2772 Churn Creek Rd., Redding, CA 96002

SILICON VALLEY CHAPTER
2nd Wednesday of each month 5:00 pm
Blue Pheasant Restaurant
22100 Stevens Creek Blvd., Cupertino, CA 95014

TRI-COUNTIES CHAPTER
2nd Thursday of each month 6:00 pm
Grinder Deli Restaurant & Catering
1 W Los Angeles Ave (Moorpark Ave), Moorpark, CA 93021