



CREIA INSPECTOR Magazine

A PUBLICATION OF THE CALIFORNIA REAL ESTATE INSPECTION ASSOCIATION

VOLUME 38 | NO. 1
SPRING 2017

MULTUMESC MAAKE GRAZIE SPASIBO KIITTO MATON MOCHCHAKKERAT OBRIGADO GRAZIE VINAKA WELALIN RAIBHMAITHAGAT CHOKRANE MULTUMESC NIRRINGRAZZJAK
ASANTE TERMAKASHI MATON SPASIBO WELALIN MATURNUWUN
TURNUWUN GRAZIE OBRIGADO MATON MERCI GRAZIE
RINGRAZZJAK MERCI WELALIN
THANK YOU MERCI

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— Alan, HousePro Home Inspections

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— Henry "Sonny" Toman



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CREIA INSPECTOR Magazine

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VISION

To protect lives, health and investments

MISSION

The California Real Estate Inspection Association promotes excellence in the real estate inspection profession and is committed in supporting every member in achieving the highest level of expertise in the industry.

CALIFORNIA REAL ESTATE INSPECTION ASSOCIATION

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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

Carson Dunlop & Associates Ltd
www.carsondunlop.com

International Code Council (ICC)

North American Deck and Railing Association www.nadra.org

Vanguard Emergency Management
www.vanguardem.com/his

BUSINESS SERVICES

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National Swimming Pool Foundation
www.nspf.org

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dba American Home Inspectors Training
www.ahit.com

Professional Home Inspection Institute
www.homeinspectioninstitute.com

United Infrared www.unitedinfrared.com

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Home Inspection Form
www.homeinspectionform.com

HomeGauge homegauge.com

Imfunu www.imfunu.com

Spectacular Home Inspection System
www.spectacularhis.com

INSURANCE

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OREP Insurance www.orep.org

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The Permit Pro Consultant
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CHAIRMAN'S MESSAGE

BY KENNETH COLLINS, CCI, CHAIRMAN OF THE BOARD

On behalf of the CREIA Board of Directors, Education and Conference Committees, we are pleased to be holding CREIA's 2017 Annual Conference, Home & Commercial Inspection Education for California Inspectors in Burlingame, California, May 4-7, 2017.

CREIA is dedicated to providing top-notch educational opportunities during its Annual Conferences to improve your knowledge and skills from the best trainers in the field. This conference was planned to sharpen your skills and broaden your business opportunities. And, protect your business liabilities against flip property disclosure issues! <https://www.creia.org/2017-annual-conference>

- Saturday CREIA Welcome and Exhibitor Reception
- Several opportunities for networking with your peers
- Opportunity to sit for the CREIA SOP/Ethics Exam
- Conference Session, ADA ICC Certification Exam Prep (Text available for purchase on-site)
- Sessions are approved for ASHI/CREIA CECs
- Many sessions are ICC approved

THANK YOU FOR THE 2017 CONFERENCE PRESENTERS

Tom Anderberg; Doug Auzat; Rod Calkum; Steve Carroll, MCI; Michael Casey, MCI; Kelly Cobeen; Phil Dregger; Steve Dunn; Fred Ellrott; Bill Fabian; Jack Girona, MCI; Brian Hannigan; Terry Howell; Michelle Kavanaugh; Ian Livingston; Dan McLaughlin; David Pace, MCI; Dennis Parra, II, MCI; Bob Pearson; Skip Walker, MCI; Gary Weaver; and Rich Zak, MCI.

I would like to personally thank the 2017 Annual Conference Committee, Bob Guyer, MCI, Chair; Sam Jabuka, CCI, IF; Dennis Parra, II, MCI; and Drew Tillman, CCI who have devoted hours to plan a conference schedule to cover inspection basics; niche/special opportunities geared to those with intermediate to advanced knowledge; and commercial inspections as well as to ensure an exceptional experience.

See you in Burlingame!

HIGHLIGHTS OF THIS YEAR'S CONFERENCE

- Wednesday and Thursday Pre-Conference Session, ICC Electrical Exam Prep* (Text available for purchase on-site)
- **NEW!** Thursday Special Session, Claims & Legal: Home Inspectors Q&A with State Farm Special Products Division (immediately following Thursday's ICC Electrical session)
- Thursday Group SOP Inspection
- Thursday Chapter Leadership Day (for Chapter Leadership and Board only)
- Friday, Saturday, and Sunday Educational Sessions with exceptional presenters and educators
- **NEW!** Friday's Associate Member Meet & Greet, Q&A with Seasoned Real Estate Inspectors and Reception – All conference attendees are welcome to experience this exceptional networking, meet & greet, casual Q & A, prizes, light hors d'oeuvres, and a drink on us!
- Saturday Annual Business, Legislative Update, Awards Presentation and Lunch
- Exhibitor Showcase – view the latest products and services offered by the many vendors that will be present



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.

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FROM ASSOCIATE TO CCI: THE NATIONAL HOME INSPECTOR EXAM

BY RICH ZAK, MCI, STATE DIRECTOR, CHAIR OF THE CREIA MEMBERSHIP COMMITTEE

The main goal of a new CREIA Associate Member is advancing to Certified CREIA Inspector (CCI), and the most challenging and quite possibly imposing task is that of passing the National Home Inspector Exam (NHIE).

CREIA has received comments from members that the NHIE is too difficult, too costly, contains irrelevant or confusing content, study material is scarce, etc. After careful review, we have found the exam to be very credible across the industry, and that there is in fact available resources to understand and prepare for the exam. Sure, there are a few questions about boilers (we do see them once in a while in California), and many questions are on technical evaluation methods or specific tools that are not necessarily required within the scope of the CREIA or ASHI Standards of Practice, however, all questions are relevant to the inspection of buildings and their systems.

A LITTLE HISTORY

Many readers may have taken the CREIA CCI exam. That exam was sunset a few years ago due the high cost of maintaining it. CREIA has since adopted the NHIE and ICC exams for the CCI and MCI certifications.

Some background on the old exams: CREIA never owned the CCI and MCI exams; the owner was the International Code Council (ICC). Years ago when the exams were created, ICC psychometricians helped in development. ICC was a different group back then – less corporate. They handled the development without charge and made money each time someone took an exam. Then, that changed. CREIA decided to make the switch to the NHIE, when the proposed cost loomed at \$25K to do the bare minimum to recertify the CCI exam. It is safe to assume that the cost would be considerably higher nowadays.

WHY SO EXPENSIVE!?

Skip Walker explains, “As I understand the process, the following happens: The psychometrician(s) and a group called Subject Matter Experts (SMEs) meet. The SMEs write questions and psychometricians edit to remove question and answer bias, etc. This process continues until there are enough questions in the bank to allow the test questions to be randomized. The questions are tested against a group and the psychometricians evaluate the responses. Some questions may be modified. Once the psychometricians are confident, the exam is published. Exam results are reviewed periodically for issues and questions are tweaked as needed. Every 5 years (I believe), the whole process is repeated with the SMEs writing additional questions, modifying outdated questions, deleting obsolete questions, and the psychometricians do the editing, etc.

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The NHIE exam was developed this way and undergoes the required periodic reviews. This is an expensive process. Everyone involved in the process comes to a central location. That means travel and lodging. The psychometricians are expensive. If recertification was going to cost \$25k a number of years ago, \$50-75k today would not surprise me.”

Additionally, there is the cost for exam hosting through approved test centers, like PSI, which is currently hosting the NHIE exam.

Another advantage in the use of the NHIE is in the event California passed a licensing requirement for home inspectors; the NHIE would likely be the “yardstick” given that it is the accepted examination by a number of states that already have licensing. CREIA members would have already passed the exam.

The NHIE Website states, “The National Home Inspector Examination is currently recognized by 29 states for home inspector regulation, is a membership requirement for the American Society of Home Inspectors, and the California Real Estate Inspection Association. The NHIE is also accepted by the Florida Association of Building Inspectors and is reimbursed by the US Veterans’ Administration for military personnel re-entering the workforce.”

The former CREIA tests were very tough as well. These exams were very code-centric. In fact, CREIA members felt that the CCI and MCI exams were tougher than the ICC certification exams. (RICH, didn’t Skip say the pass rates were about the same???)

As with many exams, passing the NHIE is as much about knowing how to take the test as knowing the information. Study resources are available, but one must have the discipline to prepare, put in the hours, and work hard.

EXAM PREP RESOURCES

The ASHI Website lists resources, the NHIE Website, (<http://homeinspectionexam.org/>) has a good list of reference materials, test information, and practice test questions available, and Michael Casey’s educational offerings all have varying levels of real information in which to prepare for the exam.

Included now with CREIA’s new standard Associate membership is the 2 book-set, the NHIE Home Inspection Manual and NHIE Study Guide. Both texts are great material to study and prepare for the NHIE test (<http://nhiestudyguide.org/get-the-set-2-2/>). Inspectors who have passed the exam also cite other helpful books on home inspection, such as the Complete Book of Home Inspection, Fourth Edition, and the Practical Guide to Home Inspection.

PREPARING FOR THE NHIE

Time and resources necessary for successfully passing the NHIE will vary from person to person. Those with past vocational experience in the building trades, those with exam-taking experience, and those with strong retention and memory skills, will obviously fair better than those without such experience. However, even persons experienced in building codes, construction, design, and/or engineering can expect to need many hours of study.

The person new to the topic of systems and components of buildings will almost certainly need to enroll in a class, program, or course on home inspection, ideally in a classroom setting, or otherwise online. Mike Casey elaborates, “It’s a tough exam if the student is not prepared. If the student prepares, they can pass. It takes commitment, really studying, and or attending a class. We have had five or so grads from our November class already pass the NHIE, and, of course, we direct them to CREIA pre-class and during. The 6-day live class is \$1,795. If a person wants to take online, we sell the Carson Dunlop online classes through

Dearborn RE-Campus platform. The Fundamentals of Home Inspection class (about 40 hours) is \$599, and the Principles of Home Inspection Class is \$899. If a student wants to take online and live class we give them about a 90 percent credit on what they spent for the online class towards the live training. I think it’s probably really hard to study just from the books. This is a visual, tactile, and knowledge-based profession wherein the best understanding and retention is live training. Plus, we take them on three inspections during the week. They are long days but worth it for those that can do it.” For more information, visit www.MichaelCasey.com

WHAT CAN WE DO TO HELP?

All CREIA certified members can help new Associates at the most basic level by understanding what the Associate is going through on their Path to Success, learn a bit about the NHIE, how to help, or empathize with someone preparing for the exam. Veteran CREIA inspectors should learn about this exam so that they can better mentor CREIA Associates. Chapter leaders are encouraged to include NHIE topics a part of chapter meetings and/or pre-meetings.

THE BOTTOM LINE

The Associate is ultimately responsible for his or her success and must do what is needed to start an inspection career: factor in the time needed to prepare in start-up plans, realistically schedule time to study and be disciplined about it. Include this in the business plan, budget the expenses for education, materials, resources, and exam fees. A good career in home inspection awaits.



Rich Zak, MCI, State Director, Chair of the CREIA Membership Committee

Sediment Traps – A New Twist

CONTRIBUTED IN MEMORY OF JERRY MCCARTHY BY SKIP WALKER, MCI

Sediment traps were first introduced into the CA Fuel Gas Code in the 2007 edition. The 2007 CA codes were adopted Jan. 1, 2008 in most areas. Many appliance manufacturers were requiring them well before the codes actually did. Since appliances must be installed in accordance with their listing, labeling and the manufacturers installation instructions. This mean that if the manufacturer required it, so did the code regardless of whether it was spelled out or not.

The purpose of a sediment trap is to prevent any debris in the gas from reaching the controller. Aging utility pipes, old distribution pipes in buildings develop corrosion on the interior surface. Movement in the pipes from utility work, remodeling, thermal expansion and contraction can loosen debris. The orifices and components in modern gas controllers have very tight tolerances. Debris can prevent the internal components from functioning properly which may lead to unsafe operating conditions.

Sediment traps and drip legs are as different as the purposes they serve. Drip legs are installed to trap moisture/condensation. They are only required in areas with gas known to have excessive moisture. That is rare these days. Drip legs are to be located at a low point in the piping system so condensation can drain into it and be trapped. With drip legs, gas flows horizontally past a tee projecting below. That way moisture drains into the drip leg.

With sediment traps, gas flows downward with a tee taking gas flow off horizontally. Debris then falls into the trap below the tee.

The CFGC tells where we don't need sediment traps. This includes: illuminating appliances (gas lamps, etc.), ranges/cooktops, clothes dryers, decorative appliances installed in vented fireplaces (log sets, etc.), gas fireplaces, and outdoor gas grills. That means that tank water heaters, tankless water heaters, forced air furnaces, floor furnaces, wall furnaces should have a sediment trap. I suspect you rarely see new installations of floor furnaces, but wall furnace replacements are not uncommon. Personally, I've only seen one new wall furnace installation with a sediment trap.

THE 2007 CFGC DESCRIBED A SEDIMENT TRAP AS FOLLOWS:

1212.7 Sediment Trap. Where a sediment trap is not incorporated as a part of the gas utilization equipment, a sediment trap shall be installed as close to the inlet of the equipment as practical at the time of equipment installation.

The sediment trap shall be either a tee fitting with a capped nipple in the bottom outlet, as illustrated in Figure 12-1, or other device recognized as an effective sediment trap. Illuminating appliances, ranges, clothes dryers, decorative vented appliances for installation in vented fireplaces, gas fireplaces, and outdoor grills shall not be required to be so equipped.

The guidance was that it be installed as close as possible to the inlet on the appliance. With water heaters, this was often interpreted as being installed directly onto the gas controller. The following illustration was given on 2007:

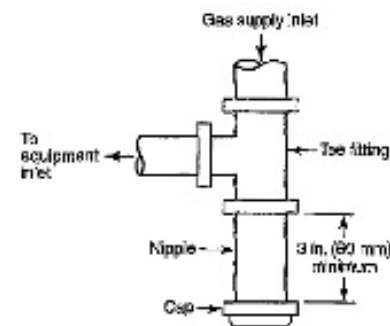


Figure 12-1 Method of installing a Tee Fitting Sediment Trap.

Image Courtesy 2007 CFGC

The 2016 CFGC has made a small but important change to the sediment trap installation requirements. The 2016 CFGC took effect Jan. 1, 2017 in most areas.

1212.8 Sediment Trap. Where a sediment trap is not

CONTINUED ON PAGE 9

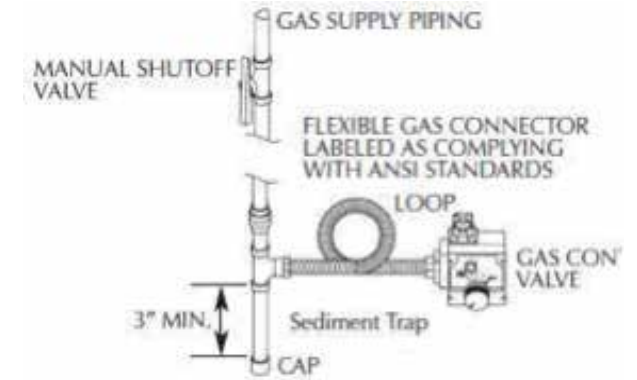
CONTINUED FROM PAGE 8

incorporated as a part of the appliance, a sediment trap shall be installed downstream of the appliance shutoff valve as close to the inlet of the appliance as practical, before the flex connector, where used at the time of appliance installation.

The sediment trap shall be either a tee fitting with a capped nipple in the bottom outlet, as illustrated in Figure 1212.8, or other device recognized as an effective sediment trap. Illuminating appliances, ranges, clothes dryers, decorative appliances for installation in vented fireplaces, gas fireplaces, and outdoor grills shall not be required to be so equipped.

The 2016 CFGC requires that the sediment trap be located AFTER the appliance shut-off valve and BEFORE the flex connector. Part of the rationale behind the change was that a flex connector is listed for connecting an appliance to the building gas piping system. If we place the flex between the shut-off and the sediment trap, it is essentially connecting two portions of the piping system together. Whether we agree with the rationale or not, the code is now very clear about the order in which things get assembled.

Per the 2016 CFGC, a sediment trap should now look like this:



It is not uncommon to see drip legs installed instead of sediment traps. It should be expected that it will take some time for the plumbers and local code officials to get up to speed on these new requirements. As usual, the education of the consumers, realtors and trades falls to us.

SPOTLIGHT ON CREIA AFFILIATE MEMBERS: ENVIRONMENTAL TESTING SERVICES

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What is radon, and why should my home be tested? Radon is a naturally occurring radioactive gas. It comes from the decay of uranium that is found in nearly all soils. Radon gas is colorless, odorless, and without taste. The presence of radon in a home cannot be detected by human senses. The only way to know if your home contains radon gas is to test. EPA recommends that homes with high Radon concentration above 4 pCi/L be mitigated. There are many straight-forward reduction techniques that will work in almost any home. At Radalink, we want to make radon testing reliable, accurate and much easier for our clients.

SCHEDULE-AT-A-GLANCE



2017 CREIA ANNUAL CONFERENCE: HOME & COMMERCIAL INSPECTION EDUCATION FOR CALIFORNIA INSPECTORS MAY 4 - 7, 2017 • BURLINGAME, CALIFORNIA

*Sharpen Your Skills & Broaden Your Business through
Commercial Inspection Opportunities. And, protect your business
liabilities against flip property disclosure issues!*

The CREIA Annual Conference has earned a well-deserved reputation as one of the most stimulating and worthwhile education opportunities for inspectors in California. Join the California Real Estate Inspection Association for its 2017 Annual Conference, Home and Commercial Education for California Inspectors to be held May 5-7, 2017 at the Crowne Plaza San Francisco Airport Hotel!

The 2017 Conference Committee has built a conference schedule to cover inspection basics; niche/special opportunities geared to those with intermediate to advanced knowledge; and commercial inspections.

The CREIA Conference is a not to miss event! Go to www.creia.org and register today!

A note about registration and CECs: Please note that you will be asked to select the sessions you would like to take during the Conference. If on-site you wish to change, you will need to complete a session switch form so that your classes and CECs are accurately applied. CECs will be auto-entered into your membership record this way.

Wednesday and Thursday, May 3-4, 2017 Pre-Conference

7:30 am – Check-in/Registration

8:00 am to 4:30 pm –
Pre-Conference Program (2 Day; 16 CECs)
ICC Electrical Exam Prep Class,
Skip Walker, MCI
(Priced separately. Text not included and available for sale on-site.) ICC approved #10769 (1.5 ICC CEUs). Stay on Thursday for the afternoon Claims session. (See below.)

Thursday, May 4, 2017 Chapter Leadership Day; Group SOP; Board Meeting

9:30 am to 5:30 pm
CREIA Chapter Leadership Day,
Facilitated by Rich Zak, MCI and David Pace, MCI
For Chapter Leaders and Board only (8 CECs)
See CREIA website to register for Leadership Day (not Annual Conference Registration)

1:00 pm to 4:00 pm –
Group SOP Inspection, a Truly Unique Toolbox
with Patrick Burger, CCI and Brett Husted, CCI facilitating

2:00 pm to 5:00 pm – Exhibitor Set-Up

4:30 pm to 6:30 pm
(Immediately following the Thursday ICC Mechanical session)
Claims and Legal: Home Inspectors Q & A,
with Doug Auzat (2 CECs)

6:00/6:30 pm
CREIA Board of Directors Dinner
(Board only - not a regular meeting of the Board)

Friday, May 5, 2017

7:30 am
Conference Registration/Check-in

7:30 am to 8:30 am – Continental Breakfast

7:30 am to 5:00 pm – Exhibit Hall Open

8:00am to 8:30 am
Chairman's Welcome Message

8:30 am to 10:00 am – Breakout Sessions (1.5 CECs)

Inspecting Defects of Flipped Properties,
Jack Girona, MCI

Inspection Photography: From Top to Bottom,
Steve Carroll, MCI (.15 ICC CEUs)

Roofs: Commercial, Gary Weaver (.15 ICC CEUs)

10:00 am to 10:30 am – Break

10:30 am to 12:00 pm – Breakout Sessions (1.5 CECs)

The Cost Of Business - Price For Success,
Brian Hannigan

Commercial Inspections Overview,
Dennis Parra, II, MCI

Flip Properties Plumbing Disclosure Issues,
Michael Casey, MCI (.15 ICC CEUs)

12:00 pm to 1:30 pm – Lunch on Own

1:30 pm to 3:00 pm – Breakout Sessions (1.5 CECs)

Commercial Plumbing Inspection,
Michael Casey, MCI (.15 ICC CEUs)

**Moisture Intrusion/Building Envelope,
Rod Calkum Liability Issues,** Doug Auzat

3:00 pm to 3:30 pm – Break

3:30 pm to 5:00 pm – Breakout Sessions (1.5 CECs)

Basic HVAC: Flip Properties Disclosure Issues,
Dan McLaughlin (.15 ICC CEUs)

Pool and Spa Inspection, Radalink Session
Terry Howell

5:00 pm to 7:00 pm –
Associate Member Meet & Greet, Q&A with Seasoned
Real Estate Inspectors and Reception

SCHEDULE-AT-A-GLANCE



Saturday, May 6, 2017

7:30 am to 5:00 pm – Registration/Check-in

7:30 am to 8:30 am – Continental Breakfast

7:30 am to 5:00 pm – Exhibit Hall Open

8:30 am to 5:00 pm

All-Day Session (6 CECs)

American Disabilities Act

ICC Certification Preparation Program,

Ian Livingston

(Text not included and available for sale on-site.)

8:30 am to 10:00 am – Breakout Sessions (1.5 CECs)

How To Reduce Your Risk and Make More Money,

Bob Pearson

Commercial Restaurant Type I Exhaust Hoods,

Dan McLaughlin (.15 ICC CEUs)

10:00 am to 10:30 am – Break

10:30 am to 12:00 pm – Breakout Sessions (1.5 CECs)

Science of Radon & Mitigation Protocols:

Radon is Real, What your Clients Need to Know,

Fred Ellrott (.15 ICC CEUs)

Residential Water Heater Systems,

Dan McLaughlin (.15 ICC CEUs)

12:00 pm to 1:30 pm

Annual Business Meeting, Legislative Update and

Awards Presentation Lunch (1.5 CECs)

1:30 pm to 3 pm – Breakout Sessions (1.5 CECs)

Roof: Flip Properties Disclosure Issues,

Gary Weaver (.15 ICC CEUs)

Understanding Drainage:

Simple signs that can positively impact home

inspection reports and decrease litigation issues,

Tom Anderberg (.15 ICC CEUs)

CREIA SOP/Ethics Exam Prep Class,

Rich Zak, MCI & David Pace, MCI

3:30 pm to 5:00 pm – Breakout Sessions (1.5 CECs)

Roof Drainage - What You Don't Know CAN Hurt You,

Phil Dregger (.15 ICC CEUs)

CREIA SOP/Ethics Exam Prep Class,

Rich Zak, MCI & David Pace, MCI

5:00 pm to 7:00 pm –

CREIA Welcome and Exhibitor Reception

Sunday, May 7, 2017

7:30 am to 5:00 pm – Registration/Check-in

7:30 am to 8:30 am – Continental Breakfast

7:30 am to 12:00 pm – Exhibits

8:30 am to 10:00 am – Breakout Session (1.5 CECs)

Commercial Roof Infrared Inspections,

Bill Fabian (.15 ICC CEUs)

8:30 am to 5:00 pm (6 CECs)

FEMA P-50, Simplified Seismic Assessment of

Detached, Single-Family, Wood-Frame Dwellings

Evaluation Tool,

Kelly Cobeen (with Marianne Knoy, CEA) (.60 ICC CEUs)

10:30 am to 5:00 pm (4.5 CECs)

Intro to Commercial Inspection,

Michael Casey, MCI (.45 ICC CEUs)

12:00 pm to 1:30 pm – Lunch on Own

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Welcome to Burlingame, an American suburban city of approximately 28,000 people in San Mateo County, California. It is located on the San Francisco Peninsula and has a significant shoreline on San Francisco Bay. The city is named after Anson Burlingame who was an attorney and a diplomat. Burlingame was settled by wealthy San Franciscans looking for a better climate.

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Thank you 2017 CREIA Conference Exhibitors!

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InspectTest

THE GLOSSARY PROJECT

by Skip Walker, MCI

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 candidate for the CREIA CCI test as most of the terms in the test are defined in The Glossary Project. It is available from the CREIA On-Line Store.

1. A flashing designed to divert water from behind a chimney, skylight or other wide projection through the roof is a _____.
2. A _____ is an inclined structural member which supports the roof, running from the exterior wall to the ridge board.
3. A _____ is an electrically insulated coupling designed to interrupt the conductivity of electrical current between two dissimilar metals to prevent electrolysis.
4. A flexible insulated electric cable or the top and bottom members of a truss are called a _____.
5. The _____ is the water supply and distribution pipes, plumbing fixtures, supports and appurtenances; soil, waste and vent pipes; sanitary drains and building sewers to a point of private or public disposal.
6. A device which prevents back-siphonage of water by admitting atmospheric pressure is a _____.
7. Materials that are rated as fire resistant are considered _____.
8. A _____ pipe connects a fuel burning appliance to a chimney.
9. The section of pipe that runs between a fixture outlet and the trap is the _____.
10. A comprehensive and detailed examination beyond that of a generalist which would include, but would not be limited to specialized knowledge or training, use of special equipment, measurements, calculations, testing, research or analysis is _____.

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 CodeCheck 8th Edition. Skip's home has ONLY photoelectric alarms installed. You may reach Skip via email at: skip@cocdecheck.com.

ANSWERS:
 (1) CRICKET (2) RAFTER (3) DIELECTRIC UNION (4) CORD (5) PLUMBING SYSTEM (6) VACUUM BREAKER
 (7) NONCOMBUSTIBLE (8) CHIMNEY CONNECTOR (9) TAIL PIECE (10) TECHNICALLY EXHAUSTIVE

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CREIA LEGISLATIVE UPDATE

BY DAVID PACE, MCI, CHAIR CREIA LEGISLATIVE COMMITTEE

CREIA is monitoring a variety of legislative measures this year. In fact, there were 49 pages in the most recent report. Below are of particular interest:

AB 717 DABABNEH – HOME INSPECTORS. (INTRODUCED: 2/15/2017 AMENDED)

NOTE: THIS WAS A SPOT LICENSING BILL WHICH HAS JUST BEEN INTRODUCED; however, we were told by Dababneh's office that it will be parked in the B&P Committee.

Existing law regulates persons who perform home inspections for a fee in connection with a property transfer, as defined. Existing law establishes a

standard of care for inspectors who are not licensed as a general contractor, structural pest control operator, or architect, or registered as a professional engineer, and declares that certain activities by a home inspector or a company that employs a home inspector constitute unfair business practices.

This bill would require a home inspector to be a licensee of the Contractors' State License Board pursuant to the Contractors' State License Law. By increasing application and examination fees received into the Contractors' License Fund, a continuously appropriated fund as it pertains to fees collected by the board, this bill would make an appropriation.

NOTE: Jerry Desmond, J.D., CREIA's Legislative Advocate, and CREIA members Skip Walker, MCI; James Koeppel, MCI; Ken Collins, CCI, Chairman of the Board; and I (Dave Pace, MCI) met with Diana Vu from Assemblyman Matthew Dababneh's office regarding the spot bill AB717. This was reported to us as being a two-year bill, which would be introduced next year. This was to be primarily an introductory meeting and we were informed AB 717 would be a licensing bill. We explained who we are and that our primary concern and driving force is - the protection of the public.

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AB 1357 CHU – HOME INSPECTORS: ROOFING CONTRACTORS: ROOF INSPECTIONS. (INTRODUCED: 2/17/2017)

Existing law regulates a person who performs certain home inspections for a fee. Existing law provides that it is an unfair business practice for a home inspector, a company that employs the inspector, or a company that is controlled by a company that also has a financial interest in a company employing a home inspector, to do various acts, including performing or offering to perform, for an additional fee, any repairs to a structure on which the inspector, or the inspector's company, has prepared a home inspection report in the past 12 months. This bill would exempt from these provisions a licensed roofing contractor that performs repairs pursuant to his or her inspection of a roof and (Item 5) would prohibit a home inspector from performing a roof, inspection on the same home upon which the home inspector performed an inspection.

This bill is currently in the Business and Professions Committee.

NOTE: We met with Annie Pham from Assemblyman Kansen Chu's office. Representing the sponsor (HomeGuard) were lobbyists Trent Smith and G.V. Ayers. Mr. Smith indicated they wanted to be able to do roof repairs on which they do home inspections and roof inspections to the end that they can certify the roofs. They indicated they do not do roof repairs on roofs in which their company does both a home inspection and roof inspection. They indicated Item 5 in the bill was not their idea but was added by the legislative types who reviewed the bill. (Item 5 - Unfair business practice.... To perform a roof inspection on the same home upon which the home inspector performed an inspection.) We explained concerns with the bill, particularly with item 5.



From L to R: Jerry Desmond, Ken Collins, Skip Walker, Dave Pave, G.V. Ayers (Gentle Rivers Consulting LLC - For Home Guard), Annie Pham - Principal Assistant for Assemblymember Kansen Chu, Trent Smith (Edelstein Gilbert Robson & Smith - For Home Guard), Jim Koepfel



From L to R: Ken Collins, Dave Pace, Diana Vu – Assemblymember Matthew Dababneh's office, Skip Walker

SB 442 NEWMAN – SWIMMING POOL SAFETY. (INTRODUCED: 2/15/2017)

Existing law requires, whenever a building permit issued for construction of a new swimming pool or spa, or any building permit is issued for remodeling of an existing pool or spa, at a private, single-family home, the pool or spa to be equipped with certain safety features. Existing law exempts facilities regulated by the State Department of Social Services from the requirements of this law. This bill would make a nonsubstantive change to this exemption.

SB 442 is based on last year's similar measure (AB 470), which was vetoed by Governor Brown. As amended, the bill would a home inspection for the transfer of real property with a swimming pool or spa to include a noninvasive physical examination of the pool or spa and dwelling for the purpose of identifying which, if any, of the 7 specified drowning prevention safety features the pool or spa is equipped. The bill would also require that the information be included in the home inspection report.

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Proponents may believe they can overcome the rationale of the veto.

SB 721 HILL – CONTRACTORS: DECKS AND BALCONIES: INSPECTION. (INTRODUCED: 2/17/2017 & AMENDED MARCH 27, 2017)

Existing law provides authority for an enforcement agency to enter and inspect any buildings or premises whenever necessary to secure compliance with or prevent a violation of the building standards published in the California Building Standards Code and other rules and regulations that the enforcement agency has the power to enforce.

This bill would require a property owner to conduct an inspection of decks, balconies, and elevated walkways more than 6 feet above ground level in a building containing 3 or more multifamily units by utilizing a person licensed to perform these inspections by the Department of Consumer Affairs. The bill would require the inspections to be completed by January 1, 2021, with certain exceptions, and would require subsequent inspections every 5 years, except as specified. The bill would require a copy of the inspection report to be filed with the county recorder and made available, as specified. The repairs made under these provisions would be required to comply with the latest edition of the California Building Standards Code and all local jurisdictional requirements. The bill would assess specified civil penalties against a property owner, in the form of a lien against the property, for failure to timely comply with these provisions, as specified. The bill would authorize local enforcing agencies to recover enforcement costs associated with these requirements.

Because this bill would impose new duties upon local enforcement authorities, it would impose a state-mandated local program.

The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

This bill contains other related provisions and other existing laws.

AB 1289 ARAMBULA – REAL PROPERTY DISCLOSURE REQUIREMENTS. (INTRODUCED: 2/17/2017)

The Real Estate Law provides for the licensure and regulation of real estate brokers and salespersons by the Real Estate Commissioner, the chief officer of the Bureau of Real Estate. This bill would delete those provisions relating to an open listing and would revise and recast those provisions to make definitions in the Real Estate Law applicable to these provisions.

SB 173 DODD – REAL ESTATE: BUREAU OF REAL ESTATE. (INTRODUCED: 1/23/2017)

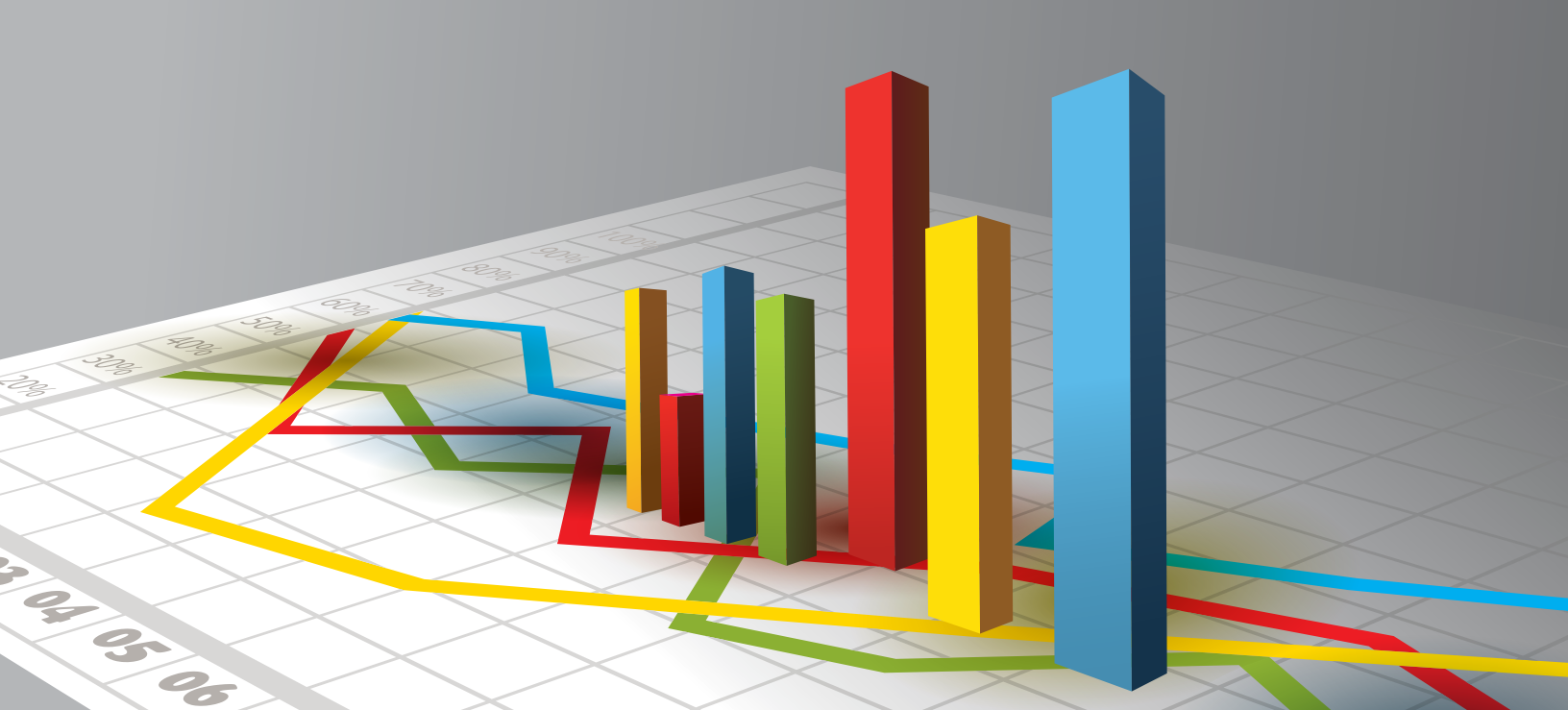
Existing law establishes in state government the Business, Consumer Services, and Housing Agency, which is comprised of various departments including the Department of Consumer Affairs. Existing law establishes the Bureau of Real Estate within the Department of Consumer Affairs to license and regulate real estate brokers and real estate salespersons. This bill would remove the bureau from the Department of Consumer Affairs and instead make it a department within the Business, Consumer Services, and Housing Agency and rename the bureau to the Department of Real Estate. The bill would also make other conforming changes.

SB 46 LEYVA – MOBILEHOMES: ENFORCEMENT ACTIONS: SUNSET PROVISION. (INTRODUCED: 12/5/2016)

The Mobilehome Parks Act requires the Department of Housing and Community Development or a city, county, or city and county that assumes responsibility for the enforcement of the act to enter and inspect mobilehome parks with a goal of inspecting at least 5% of the parks each year to ensure enforcement of the act and implementing regulations. Existing law also requires an enforcement agency to issue notice to correct a violation, as specified. Existing law repeals these provisions on January 1, 2019. A violation of these provisions is a misdemeanor. This bill would remove the repeal date of January 1, 2019, and would extend these provisions indefinitely.

This bill contains other related provisions and other existing laws.

The CREIA Legislative Committee will be participating in strategy meetings and will keep the membership updated via Legislative Alerts, conversations in the T.I.E., CREIA eNews, and the CREIA Inspector Maga



How to Raise Your Price Without Killing Your Business – Part 1

BY ALAN CARSON, CARSON DUNLOP,
www.carsondunlop.com, Carson Dunlop is a CREIA Educational Affiliate

Here's the premise: the quickest and most effective way to grow your business is to raise your prices.

DON'T GROW BY DOING MORE

Most people think that growing their business means doing more inspections. That may include working longer hours, working more days and/or hiring and training other inspectors. Others look to add more services. While these are both traditional and effective, there is another way to grow that doesn't require nearly as much time, effort or money.

RAISE YOUR PRICES

You can grow your business without having to do more work, find more people, or add more services - simply raise your prices.

KEEP UP WITH INFLATION

You might increase your prices to increase your profit. Even if you don't, you should increase your prices to keep up with inflation. If your prices are static, you will make less and

less over time as your costs increase. Inflation in the U.S. has totaled approximately 8.8% since 2010. Have your fees kept up? For example, if your fees were \$350 in 2010, they should be \$383 now. (Sources: World Bank, Multpl.com, Inflationdata.com)

WHAT HAPPENS WHEN YOU CHANGE YOUR PRICES?

The assumption and the fear is, "If I raise my prices, I will lose business." That's logical, but may be a bad assumption. It assumes that prices are elastic, which means that increasing prices will reduce demand; and dropping prices will increase demand.

We can tell you from our 37 years of experience in home inspection that increasing prices does not reduce demand for a home inspection company. In fact, people rarely notice when we change our prices.

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HERE'S THE SECRET

We keep our prices at odd numbers that are not memorable. We change them in small amounts twice a year on no specific dates. We don't announce our price changes. If asked about a price increase, we say we are trying to keep up with inflation so we can continue to provide the outstanding service that people expect of us.

Many other sectors regularly increase prices without announcing the change. These include medical care fees and auto repair service fees, for example.

Timing matters. It's better to raise your prices when you are busy, rather than during a slow time of year. Pricing decisions should be made independently, not in cooperation with other service providers, to avoid any perception of price fixing.

If you had raised your 2010 fees of \$350 by 1%, twice a year for 5 years, you would have kept up with inflation, and your fees would now be roughly \$383.

If your fees are higher than average, you are often perceived as a higher quality service. Make sure you deliver at that level!

There are several studies that show for many things the impact of price change on demand is negligible. Prices are inelastic for things like gasoline and tobacco - things that people perceive they need. Prices for luxury items such as diamonds are also relatively inelastic. It turns out prices for occasionally used consulting services are also inelastic.

WHAT IF VOLUME GOES DOWN?

Let's say we are wrong - you raise your prices and your business does slow down. That's great! You now have more time to do marketing, sales, and promotion. In short order, your business volume will be back up to where it was before, only now you are making more money on every inspection. You can then repeat the process. This is called a ratcheting technique to grow your business.

The premise is simple: Increase your prices and business volume decreases. Market yourself well and business volume increases. Increase your prices again, and so on.

For the pessimists - how much business can you lose before you are worse off than before you raised your prices? Let's look at a dramatic example.

VERY HARD TO LOSE

We'll assume you do 200 inspections per year. You charge an average of \$350. Your sales are $200 \times \$350 = \$70,000$.

HERE'S A SIMPLIFIED INCOME STATEMENT:

Sales: \$70,000

Expenses: \$50,000 (Your salary, vehicle, sales & marketing, insurance, phones, rent, etc.)

Profit: \$20,000

Let's raise your price by 10%. (Crazy, I know.) Let's assume that you lose 10% of your business volume.

Your new fee is \$385 ($\$350 \times 110\%$), and your new business volume is 180 inspections ($200 \times 90\%$). Your sales are now ($180 \times \$385$) \$69,300.

Sales are down by \$700 ($\$70,000 - \$69,300$), but you are only working 90% as much for 99% of the sales revenue. Your expenses also went down! This is because you are only doing 90% of the inspections, writing 90% as many reports, and driving 90% as much. If you save even \$1,000 in expenses, your profit actually goes up!

A calculation done by the accounting firm Vine and Partners, suggests that if your margin is 60 percent (meaning 40 percent of your income goes to expenses - typical for a sole proprietor), then you could raise your prices by 20 percent, decrease your sales volume by 25 percent, and still break even. If your margin is 40 percent (60% of your sales goes to expenses - typical for multi-inspector firms), you could raise your prices by 20 percent, decrease sales by 33 percent, and still break even!

Again, this is a dramatic example, and we don't expect you to raise your prices by 10%, even though you probably should. The same principles apply to smaller price increases. We hope this convinces you to raise your prices in small increments on a regular basis.

BONUS SCENARIO

Just for fun, let's say we are right, and raising your prices won't reduce sales. If we raise prices by that crazy 10%, sales go from \$70,000 to \$77,000, and you get to keep the entire 10%, or \$7,000. So if your profit was \$20,000, it's now \$27,000 - a 35% increase in profit! Let that sink in for a bit....The numbers work, even if you increase your prices by 1%, 2%, 5%, 15% or whatever.

We have looked at the rationale behind raising your prices to grow your business. We discussed pricing versus volume, and price elasticity. In Part 2 of this article, we will introduce prestige pricing, as well as agent reactions, and we will touch on experimenting.

Thanks to Kevin O'Hornett and Roger Hankey for some very helpful input on this article.

WATER CONSERVATION AND THE HOME INSPECTOR

BY RICK HARTMANN, CCI, HOME INSPECTION PLUS, INC., LINCOLN, CA

I recently purchased a new faucet for my kitchen sink. Paid good money for that polished nickel beauty too! After I installed it, water didn't flow very quickly from it. My old faucet would fill a 6-quart pot in 9 seconds. I measured the flow rate of the new faucet and found a whopping 1.3 gallons per minute (gpm) of flow. What the heck? I thought I had a clog in the water supply line or the aerator was clogged or that there was a manufacturing defect. I even went outside to double check the water pressure. Well friends, if you live in California, get used to this.

As you have probably noticed, California is still in a drought. I went on a road trip in August, and displayed on every Caltrans changeable message sign, up and down the state was the message, "SERIOUS DROUGHT - HELP SAVE WATER." In January of 2014, Governor Jerry Brown declared a statewide drought emergency and asked that water consumption be voluntarily cut by 20%. Between June 2014 and January 2015, water usage was cut by only 9.7%. In April 2015, Governor Brown directed the State Water Resources Control Board to implement mandatory water reductions in cities across California to reduce water usage by 25%. This explains why at my favorite golf course the greens are brown and my neighbor's lawn is dead. The California Energy Commission also has new rules for us, but a little toilet and water usage history lesson first...

Despite what you may have heard, Thomas Crapper did not invent the flushing toilet (no relevance to

this article, I just thought this was funny!). Some sort of flushing toilet had been in use since the time of the Egyptians. John Harrington in England reinvented the flushing toilet in the late 16th century. In America, the first flushable toilets entered the market in the 1880's and used 10 gallons of water per flush! In the 1920's, toilets used 5-7 gallons per flush (gpf). In 1978, plumbers were aghast when 3.5 gpf toilets were mandated. No one thought this amount of water would clear the bowl and have enough water to flow the waste through the waste piping to the street. It did. In 1992, Congress passed the Environmental Policy Act of 1992, mandating the maximum water consumption for a toilet be no more than 1.6 gpf. "What? It'll never work!" It did. As of January 1, 2016, all plumbing fixtures sold and installed in California must meet the following requirements:

1. All water closets (toilets) shall be no more than 1.28 gpf.
2. All lavatory (bathroom sink) faucets shall be no more than 1.2 gpm.
3. All kitchen sink faucets shall be no more than 1.8 gpm.
4. All shower heads/spray wands shall be no more than 2.0 gpm.

Senate Bill 407 became law on January 1, 2014, and applies to all Single Family Residences built before January 1, 1994. This legislation requires that water conserving plumbing fixtures be installed throughout the home as a condition of building permits applied for after January 1, 2014. As of January 1, 2017 all single-family residences built prior to January 1, 1994 must comply with these

requirements (permit or no permit) and homeowners are required to install water saving fixtures, if current fixtures are out of compliance. This law will not affect commercial or multi-family properties until January 1, 2019.

HERE ARE THE RULES

- **If a toilet is greater than 1.6 gpf, a 1.28 gpf toilet is required.**
- **If a shower head flows more than 2.5 gpm, a 2 gpm shower head is required.**
- **If a lavatory faucet flows more than 2.2 gpm, a 1.2 gpm faucet is required.**
- **If a kitchen sink faucet flows more than 2.2 gpm, a 1.8 gpm faucet is required.**
- **If a urinal (wall mounted) uses more than 1 gpf, a .125 gpf urinal is required.**

As a condition of all building permits issued for home improvements the Authority Having Jurisdiction (AHJ) is charged with verifying compliance with these requirements. For example, the City of Concord, CA will utilize self-certification by the property owner in lieu of inspections when a building permit is taken out. Basically, if you take out a building permit, you sign a form saying your fixtures are compliant. Whether a jurisdictional inspector will measure flow rates and inspect toilets inside the home is yet to be seen.

The California Civil Code Section 1101.1-1101.8 states the following, in part:

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1101.4. (a) On and after January 1, 2014, for all building alterations or improvements to single-family residential real property, as a condition for issuance of a certificate of final completion and occupancy or final permit approval by the local building department, the permit applicant shall replace all noncompliant plumbing fixtures with water-conserving plumbing fixtures.

(b) On or before January 1, 2017, noncompliant plumbing fixtures in any single-family residential real property shall be replaced by the property owner with water-conserving plumbing fixtures.

(c) On and after January 1, 2017, a seller or transferor of single-family residential real property shall disclose in writing to the prospective purchaser or transferee the requirements of subdivision (b) and whether the real property includes any noncompliant plumbing fixtures.

If you are selling your home after January 1, 2017, you are required to replace non-compliant fixtures or disclose what fixtures are non-compliant. Yes, there will be another real estate disclosure form to fill out.

The CREIA Standards of Practice do not require a home inspector to determine exact flow rates at faucets and shower heads. However, many home inspectors are now being asked by homebuyers, about the flow rates for water fixtures in homes they are looking to purchase. I'm expecting this will be asked of home inspectors quite a bit more after January 1, 2017. Even though the seller will be required to replace plumbing fixtures and report/disclose any non-compliant fixtures, I'm sure many homebuyers and real estate agents alike, will be querying the home inspector about this. I can hear it now...."Hey Rick, do you think the shower head in the master bathroom flows more than 2.0 gpm? The seller stated they replaced it with a US EPA Water Sense specified shower head, but I think it flows more." Keep in mind; the CREIA Standards of Practice (SOP's) are minimum requirements for conducting a home inspection. Every

home inspector is different and each home inspector determines how far he or she will exceed the SOP's, if at all. If determining flow rates for every fixture during the course of a home inspection is part of that inspector's routine, that's great. I do know that I will be adding some boilerplate language into my report explaining the new building standards. CREIA inspectors are required to report material defects that 'significantly' affect the value, desirability, habitability, and safety of the dwelling. If a toilet uses a 1/3rd of a gallon more water than it is currently supposed to, this is insignificant in my opinion. But, in drought-stricken California, homebuyers will probably begin asking and home inspectors should be prepared to deal with this and report accordingly. The value of a home can be affected, if the new homeowner finds themselves forced to replace all the plumbing fixtures and toilets if they are found to be non-compliant.

The CREIA inspector is required to inspect for 'functional flow.' This means, in the opinion of the inspector, 'are the flow rates at fixtures adequate?' With lower flowing fixtures, this may momentarily confuse a seasoned inspector, who is used to seeing 2.2 gpm flow rates at sinks, and even more if the home was built before 1994. When an inspector encounters a sink faucet flowing at 1.2 gpm or less, it seems inadequate. I hope that home inspectors reading this become aware of the new flow rate mandates in California and adjust their thinking/inspection techniques/report writing accordingly. A few things need to be taken into consideration.... what year was the home built? Is galvanized water supply piping installed which could reduce flow rates, even with water conserving fixtures installed? Does the fixture look older/newer? What/how to report? What if a home inspector is asked by a homebuyer to determine the flow rate of a sink faucet during the inspection? They have two choices, to check it or not. The seller will be required to disclose this anyway after January 1, 2017, so it basically removes the home inspector from the fixture



compliance equation. Personally, I am not going to determine flow rates for all fixtures in the home unless pressed to do so. Toilets are easy to determine as the gpf is usually stamped on the bowl. For showerheads and faucets, the only way to determine the flow rate for those fixtures is to fill a container at each fixture and time it. I carry a 1/2 gallon (2 qt) container in my car, just in case I am asked to check flow rates.

Some folks may be curious how to measure flow rates. If so, get a one gallon or half-gallon container and a stop watch and measure. For example, if it takes 24 seconds to fill a 1/2-gallon container, the flow rate is 1.25 gpm. If it takes 30 seconds to fill a one-gallon container, the flow rate is 2 gpm.

In California, lavatory faucets that flow more than 1.2 gpm are becoming scarce. Peerless and Delta, who are two of the largest manufacturers of faucets, stopped shipping higher flowing faucets to California on July 1, 2016.

So, with all this information, new laws and the possible conundrum of whether or not to check flow rates or how to deal with inquisitive buyers and real estate agents, I would suggest that when higher flowing fixtures are detected,

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inspectors should make a notation of it in their report and mention the new laws. Imagine the frustration, when a new homeowner which just had a home inspection performed, takes out a permit to replace say, a water heater, and is then told that all the home's toilets and fixtures will need to be changed because they are not in compliance. It would be a costly surprise! A phone call from the new homeowner to the home inspector could be averted by some simple language in the inspection report.

HERE ARE A FEW CHOICES:

[NOTE] As of January 1, 2017, building standards/state law require that flow rates for fixtures in the home not exceed 1.6 gpf for toilets, 2.2 gpm for faucets and 2.5 gpm for shower heads. It is beyond the scope of the inspection to determine the flow rates of the plumbing fixtures in the home. Refer to seller.

OR

[Upgrade / Corrections Recommended] The flow rate at the faucet in the guest bathroom exceeds 2.2 gpm, which is higher than current California State Law allows. Recommend installing a 1.2 gpm lavatory faucet.

Air Conditioner Refrigerant Lines

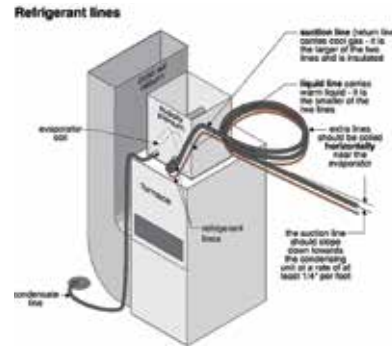
BY ALAN CARSON, CARSON DUNLOP,
www.carsondunlop.com, Carson Dunlop is a CREIA Educational Affiliate

FUNCTION AND MATERIAL

Air conditioning systems rely on movement and change of state (evaporation and condensation) of refrigerants between an outdoor condenser coil and an indoor evaporator coil. The lines that carry the refrigerant between the evaporator and condenser coils and through the compressor and expansion device are typically copper. The larger line typically carries a cool gas and is insulated. This is referred to as the suction line. It is also called the return line or vapor line. The smaller un-insulated line typically carries a warm liquid. It is most often called the liquid line. Where the evaporator coil is higher than the condensing unit, the suction line should slope down toward the condensing unit with a slope of at least one-quarter inch per foot to allow oil to flow back to the condensing unit. The oil, which is used to lubricate the compressor, travels with the refrigerant through the system.

LINE COILED HORIZONTALLY AND REFRIGERANT BOILING POINTS

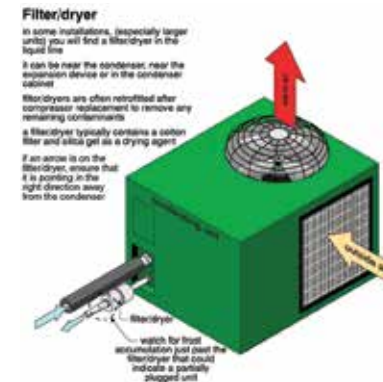
Any extra piping may be coiled near the evaporator coil. The line should be coiled horizontally rather than vertically. Again, the lines should allow oil to flow back to the condensing unit. With R-22 (old refrigerant) operating pressures in the lines are typically in the order of 70 psi on the suction side of the system and more than 230 psi on the discharge side. R-410A (modern refrigerant) might have a suction pressure of about 120 psi and a discharge pressure of 380 psi. There is considerable variation in these numbers, and they are not critical to know since we are not testing refrigerant pressure. Since refrigerants are a gas at atmospheric temperature and pressure, leakage through the lines will dissipate as a gas and may leave an oil residue. At atmospheric pressure, R-22 has a boiling point of roughly -41°F, and R-410A is around -63 °F.



FILTER/DRYER (OR FILTER/DRIER)

In some installations, you will find a filter/dryer in the liquid line. Filter/dryers clean and dry the refrigerant. Installers often add these to a system when the compressor is replaced, or a refrigerant leak has required recharging. They

help remove any contaminants. They are roughly the size and shape of a soft drink can. They may be located in the liquid line near the condenser outlet or near the expansion device, close to the evaporator. Many have an arrow on them to show the direction of flow. If possible, check that it is pointing in the right direction. Bidirectional units with arrows pointing both ways are acceptable.



A typical filter/dryer - ensure that arrow is facing away from condenser

WATCH FOR FROST

Frost accumulation just past the filter/dryer indicates a partially plugged unit and service should be recommended.

ACCUMULATOR

Some air conditioning units and most heat pumps have accumulators designed to prevent liquid from getting into the compressor. Compressors are designed to pump gases and are damaged if liquids are introduced. Accumulators on air-conditioning systems are typically located in the condenser cabinet just upstream of the compressor. They are metal cylinders

typically, with refrigerant lines going into and coming out of the top. There is not much to inspect.

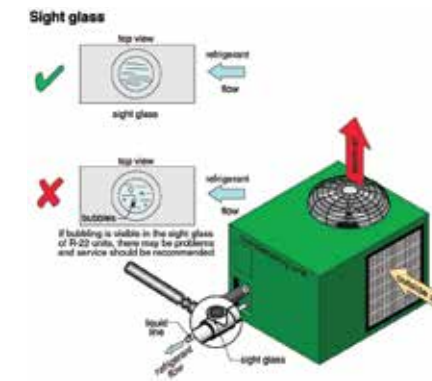
SUPPORTS AND RADIUS OF BENDS

Refrigerant lines should be supported every 5 to 6 feet. Bends in refrigerant lines should have a minimum 12-inch radius.

SIGHT GLASS

A sight glass may be installed on the liquid line, usually near the condenser. This allows the service person to check refrigerant levels. If bubbling is noted in the sight glass on an R-22 unit, this indicates possible problems and service should be recommended. It is unlikely there will be a sight glass on an R-410A system, but if there is, bubbles do not indicate a problem. The sight glass is about one inch in diameter. Many sight glasses have a colored ring. If the ring color changes, this indicates moisture in the refrigerant. This is a serious condition. As little as one tablespoon of moisture in the refrigerant system will destroy a compressor in a few months.

Sight glasses are more common on commercial systems than on home air conditioning systems. They are especially rare on newer residential equipment as charging methods have changed over the years.



Common refrigerant line problems include:

1. Leaking
2. Damage
3. Missing insulation

4. Lines too warm or cold
5. Lines touching each other

Let's have a look at three of the common conditions.

LEAKING

Oil residue on the line usually indicates a leak in the piping, often at a connection. Because oil travels through the system with the refrigerant, a leak will often show up as an oil stain. Escaping refrigerant boils off and leaves no trace other than the oil.

CAUSES

Refrigerant leakage is usually the result of corrosion or mechanical damage.

CORROSION AND SLUDGE

Corrosion is often the result of contaminants in the system, copper lines touching galvanized ductwork or other dissimilar metals, or a corrosive atmosphere in the house caused by chemical storage, furniture refinishing, gypsum board with high sulfur content (Chinese drywall), etc.

MECHANICAL DAMAGE

Mechanical damage to refrigerant lines can occur at the outdoor unit if they are bumped by a lawn mower, for example. Mechanical damage may also be possible where the lines go through the exterior house wall.

SETTLEMENT

Settlement of the condenser or building can stress the copper lines. People playing or working around the air conditioner may step on the lines. The lines running through the house can be damaged by driven nails, careless handling of storage, etc.

IMPLICATIONS

If the refrigerant leaks out, the system performance will deteriorate and the house will be less comfortable.

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Ultimately, the compressor may fail or the system may shut down.

STRATEGY

Since refrigerant lines do not have any connections/joints that may leak except at the coils, concentrate on the connections to the coils at either end, where visible. If there is a thermostatic expansion valve, check its connections. Check along the length of the line for evidence of mechanical damage, particularly in exposed areas and at the interior and exterior penetration points through the house wall. Refrigerant lines need support so that joints aren't stressed under the weight of the lines. On attic units, pay attention to where the lines disappear into walls or ceilings.

LINES THROUGH THE WALL

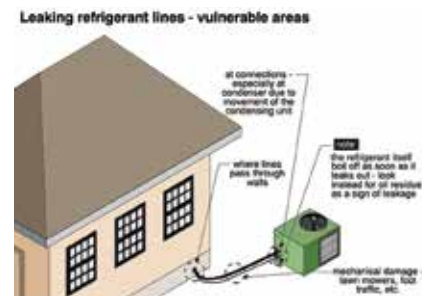
Where refrigerant lines go through walls, the hole in the wall should be considerably larger than the refrigerant lines and the lines are ideally (but not commonly) in conduit where they go through the wall. Flexible material should seal the inner and outer ends of the conduit to allow movement but to prevent moisture and insect entry into the building and heat loss out of the building.



Connection near the condenser is a common area for leaks

OIL STAINS

Look for evidence of oil stains on the refrigerant lines. Service technicians use leak detection fluids, halide torches or electronic leak detectors. These are beyond our scope.



Stains below the suction line indicate leaking

MISSING INSULATION

The large-diameter line (suction line or gas line) should be insulated along its entire length. The insulation has two functions:

1. It prevents the suction line from sweating and dripping water inside the house.
2. The insulation also prevents the suction line from heating up outdoors on its way to the compressor. We are trying to take heat out of the house and dump it outside. We do not want to collect more outdoor heat in the suction line before it goes into the compressor.

CAUSES

- Insulation may be missing because –
- it was never put on in the first place
 - animals have chewed it
 - service people have pulled it away to inspect or repair areas
 - the insulation may have worn away or deteriorated by exposure to sunlight

IMPLICATIONS

Missing outdoor insulation results in less comfort, higher operating cost and shorter life span of the equipment). Water damage to the home may result if the indoor insulation is missing, incomplete or damaged.

STRATEGY

Look for the insulation to be intact along its entire length. Pay particular attention to the outdoor section of the suction line.



Damaged insulation due to vermin activity



Suction line is missing most of its insulation

LINES TOO WARM OR TOO COLD

COLD SUCTION LINE

When the system is operating, the large insulated suction line should be cold

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to the touch and sweating at any point where there is no insulation

WARM LIQUID LINE

The smaller un-insulated liquid line should be warm to the touch after the system has been operating for 10 or 15 minutes.

CAUSES

There are many causes for poor system performance. Some of them have been touched on earlier in this Module. You won't be able to determine the causes in most cases. Further investigation should be recommended.

FROST

Frost on the suction line may indicate too much refrigerant going through the expansion device, an inoperative house air fan, too much refrigerant or too low an outdoor temperature. Frost on the liquid line may mean the dryer is clogged. Frost on the expansion device may mean the device is clogged with ice.

IMPLICATIONS

A lack of adequate cooling in the house and possible compressor damage are the implications.

Strategy Touching the lines is a part of any inspection when the air conditioner is operating. Look for the suction line to be at roughly 45°F to 55°F, and the liquid line to be at about 90°F to 110°F. Measurement with instruments is not needed. If the suction line isn't cold, or the liquid line isn't warm, servicing should be recommended.

CONCLUSION

We have introduced refrigerant lines from Air Conditioners in this discussion. Thanks to Roger Hankey and Kevin O'Hornett for their thoughtful review and input.

CHAPTER MEETING HIGHLIGHTS

FROM ERNEST EVERETT, CCI, CHAPTER LEADER OF THE ORANGE COUNTY CHAPTER

Joe Hetzel, Technical Director of the Door & Access Systems Manufacturers Association (DASMA) flew in from Cleveland, Ohio on March 20 to speak at the Orange County Chapter Meeting. Joe explained various points of garage door safety and inspection.



FROM BILL SCHULTZ, CCI, CHAPTER PRESIDENT OF THE PALM SPRINGS CHAPTER

On March 3 the Palm Springs Chapter held a toolbox, Stucco Installations and Typical Defects with Gary Weaver. The toolbox was excellent and it is the second time they had Gary speak at a toolbox.



This toolbox featured a brief review of the typical residential wood frame and light commercial wood and steel frame cement plaster stucco installations. A checklist of problems encountered during construction and their typical visual manifestation and required correction. Moisture problems association with lathing, drainage plane, weep placement, flashing, windows, painting and elastomeric coating. Discussion of non-traditional insulated assemblies typically found in commercial construction was also reviewed for individuals providing property assessments.

Hear Gary at the upcoming CREIA Conference!

FROM FRED SCHNEIDER, CHAPTER PRESIDENT OF THE NORTH SAN DIEGO/TEMECULA VALLEY CHAPTER

The chapter held a toolbox in January with Silvercrest Manufactured Homes and in February with Pacific Drain/Arrow Pipeline.



This four-hour session was held with Darin Duncan a 31 year experienced Journeyman plumber and Billy Stewart, a 24-year experienced plumber and Plumbing Division Manager. They highlighted new technologies, critical elements used in the trade and hands-on displays of Trenchless Sewer replacement equipment and materials; and Tankless Water Heaters. The toolbox also featured lively discussion and insightful elements of plumbing.

Steven Harwood, Marketing Manager hosted a Silvercrest Manufactured Constructions Assembly Tour.

YOU WORK HARD FOR THE MONEY

BY DAVID BRAUNER, SENIOR BROKER, OREP INSURANCE

You work hard on every inspection and earn every dollar right? So when it comes to spending those dollars on insurance, you want to make sure coverage will be there when you need it. One way to ensure that you're protected if trouble brews is to make sure your E&O policy doesn't expire- either by not renewing on or before the annual expiration date or by being cancelled midterm for failure to pay. You must keep your insurance policy in force to stay protected. Switching to another insurance provider is fine, as long as it's on or before expiration and there is a continuity of coverage. Why?



Most home inspector policies are Claims Made, which means the policy must be in force at the time the claim is reported. Most home inspection claims occur within one year of the inspection- which is the good news. Some claims for real estate appraisers can go back from appraisals over 10 years old! Now, say a claim surfaces today from an inspection you did one year ago, when you had insurance coverage; if you're still covered without a lapse the policy should respond to any covered claim. But say you went on vacation a few months after the inspection, didn't renew and let the policy expire- what now? Even though you were covered at the time of the inspection, the policy probably will not respond to that claim because you let the policy lapse. This is the case even if you eventually buy insurance again and are covered now. The policy term ended and there is no coverage for the claim. Again, switching coverage to another provider is fine, as long as it's done prior to expiration.

REPORTING

Another way to protect yourself, your family and your business is to report all claims and/or circumstances that may lead to a claim to your insurance agent and/or insurance carrier when they happen- even the small stuff. OREP, a Premier Affiliate with CREIA, provides a free claims helpline managed by insurance company professionals who can help you nip a complaint in the bud before it turns into a claim. One surefire way to cause yourself grief is to try to "handle" a complaint yourself. Many times they can end it before it

begins. If the issue turns out to be more than a nuisance complaint, the professionals are there to take the problem off your hands. Reporting incidents and even claims does not automatically raise your premium either. In most cases we have seen, there is no penalty for reporting and getting help.

It is in your best interests to report all claims and incidents that might lead to a claim for another reason: you are required to. The language in most E&O insurance policies requires you to report any incident or claim when it surfaces as a condition of coverage, and an

incident can be defined as a verbal as well as written complaint in some policies. If you fail to report a complaint when it first surfaces, a carrier can decline coverage later, when it turns into something, if they feel the delay hurt the defense. It's very unusual but can happen, even if you have maintained coverage. All carriers work the same way.

But here's the good news: with the claim scenario described above, say the complaint from the inspection one year ago surfaced right away and you reported it at the time: even if you went on vacation and let the policy lapse in the meantime, it will respond to a covered claim that escalates later, even if you're no longer insured or had a break in coverage, because you reported during the policy period. It pays to understand your coverage.

OREP has been helping home inspectors over 15 years with their E&O insurance. We look forward to helping you with competitive rates, great service and years of experience.

David Brauner is Publisher of Working RE magazine and Senior Broker at OREP, a leading provider of E&O Insurance for appraisers, inspectors and other real estate professionals in 49 states (OREP.org). He has provided E&O insurance to appraisers for over 20 years. He can be contacted at dbrauner@orep.org or (888) 347-5273. Calif. Insurance Lic. #0C89873. OREP—Organization of Real Estate Professionals

Inspecting Existing Dwelling Electrical Systems Using NFPA 73

BY SKIP WALKER, MCI

On December 31, 1879, Thomas Edison exhibited electrical lighting for the first time in a residential neighborhood in Menlo Park, California.



By 1920, almost half of US rural and non-rural homes had electricity. By 1940, that number reached almost 90 percent. These early electrical installations were unsafe by any measure. With the rapid electrification of America came a dramatic rise in electrical fires. A 1980 CPSC study confirmed that the instance of electrical fires is disproportionately higher in homes more than 40 years old.

Many inspectors were contractors in some prior work "life." Those with contracting backgrounds seem to have come from the "nail-pounding" side of the business. You may be comfortable with foundations and framing, but the electrical system part of an inspection is outside the comfort zone for many of us.

The CREIA Standards of Practice define the scope of what we must inspect on electrical systems. Per the SOP's, the inspector shall:

SECTION 6 – ELECTRICAL SYSTEMS

A. Items to be inspected:

- Service equipment
- Electrical panels
- Circuit wiring
- Switches, receptacles, outlets, and lighting fixtures

B. The inspector is not required to:

- Operate circuit breakers or circuit interrupters

- Remove cover plates
- Inspect de-icing systems or components
- Inspect private or emergency electrical supply systems or components

The CREIA SOP's may seem simplistic. Our SOP's are not intended to be a checklist for inspections. Rather, they are intended to provide guidance as to the scope of the inspection. For risk-management reasons, the wording is intentionally minimalistic. **To properly evaluate the items listed in the SOP is far from simple. CREIA Standards and California Business and Professions Code 7195-7199 require the inspector to identify "Material Defects."** A "Material Defect" is a condition that significantly affects the Value, Desirability, Habitability, or Safety of the dwelling.

A thorough understanding of electrical theory and the implications of improper installation is critical to proper reporting. We are not required to do anything that is unsafe. This is important because there can be significant safety hazards lurking inside that panel, crawlspace, etc. Since much of the electrical wiring system is concealed in walls, etc., it is critical to make it clear to our clients both what we could and could not see.

When considering how to approach electrical system inspections, a document that I encourage everyone to study is NFPA 73 – Standard for Electrical Inspection for Existing Dwellings. NFPA 73 is an optional electrical inspection standard. NFPA 73 must be specifically adopted by

your local authority having jurisdiction to be enforceable. I am unaware of any California jurisdictions that have adopted the standard.

Development of NFPA 73 began in 1990. The NFPA 73 committee began by reviewing statistical data from a variety of sources. The original development drew on research and statistics from NFPA, the insurance industry, Consumer Product Safety Commission (CPSC), National Institute of Standards and Technology (NIST). The data clearly shows that the risk of fires is significantly lower when the electrical systems are installed and maintained in accordance with the electric codes.

The original version of NFPA 73 was adopted in 1993 as the "Residential Electrical Maintenance Code for One- and Two-Family Dwellings." The current version of the code is NFPA 73 – Standard for Electrical Inspection for Existing Dwellings 2016.

The NFPA 73 committee used an interesting approach in developing the standard. They analyzed electrical related problems, i.e.; fires, injuries, deaths, etc., and then worked backwards to what caused them. This produced a list of electrical issues that were common to many incidents. The idea behind NFPA 73 is to identify and rectify these issues before they can cause bigger problems.

In 2008, the National Fire Protection Research Foundation completed a multi-year study titled Residential Electrical Systems Aging Project.

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This study involved the removal of electrical components and wiring from 30 homes in ten different states. The age of the homes ranged from 30 years old to 110 years old. Each home was inspected, documented, and photographed by a qualified individual. The electrical components recovered were sent to the UL Chicago facility for laboratory analysis.



FPRF, Recovering Wiring from Test Home in Chicago, IL.



FPRF, Service Panel from Sample Home, Arcing Damage

An analysis of the data from Residential Electrical Systems Aging Project produced a list of the Top Five Recommendations to improve electrical safety in older installations. They are:

- Install GFCI's where required by current code. This includes Bathrooms, Kitchens, Exterior, Garage, Laundry and at Utility Sinks
- Replace old receptacles. Especially those older than 1960, where damaged, or having low retention force. If ungrounded, install GFCI protection or upgrade to grounded circuit.
- Install S-Type Fuse adaptors and properly sized fuses.

- Use proper wiring methods to extend circuits and add receptacles. No surface stapled zip-cord, etc. Especially important in pre-1960 systems.
- Replace any older BX-cable (1960 and before) that does not have a bonding wire. The resistance in older/unbonded BX will often exceed maximum allowed for the run length. As an alternative, install AFCI's and or GFCI's protect BX circuits.

Many of the lessons learned from the project have been integrated into the NFPA 73 standard. The standard breaks down the areas to be inspected into several major categories. Under each category is a list of specific issues where improper installation/and or maintenance posed a significant safety issues, contributed to property loss, injuries or loss of life.

The general categories identified in NFPA 73 are:

- 1) General Examination and Use of Installed Equipment
- 2) Services, Outside Feeders, and Outside Branch Circuits
- 3) Panelboards and Distribution Equipment
- 4) Overcurrent Protective Devices
- 5) Cables, Cable Assemblies, and Conductors,
- 6) Flexible Cords and Cables
- 7) Raceways
- 8) Permanently Connected Luminaires (Lighting Fixtures)
- 9) Boxes and Enclosures
- 10) General-Use Switches and Receptacles
- 11) Appliances and Special Equipment:
 - a) Ground-Fault Circuit Interrupters
 - b) Smoke Alarms
 - c) Appliances and Utilization Equipment
 - d) Arc-Fault Circuit Interrupters
 - e) Ceiling-Suspended (Paddle) Fans

Let's take a look at each of these areas in more detail.

GENERAL EXAMINATION AND USE OF INSTALLED EQUIPMENT

All electrical equipment must be listed and labeled. The equipment must be installed in accordance with the listing, labeling and the manufacturers installation instructions. Electrical components installed in damp, wet, harsh environments, or areas subject to excessive temperatures must be listed for use in those areas.

All openings in enclosures must be sealed using means that provide protection equivalent to the enclosure case. Openings for mounting or allowed under the listing need not be sealed. Metallic plugs used in non-metallic enclosures must be recessed a minimum of ¼-in. below the face of the enclosure.

The interior components of panels, such as buss bars, terminal busses, etc. must not be contaminated by foreign materials or corrosive agents. This includes paint, plaster, abrasive or corrosive residue. The components must not be cut, bent damaged, heat damaged, damaged by corrosion or compromised in ways that impact the safe operation or mechanical strength of the equipment.

Unless the connection method is listed for dissimilar metals, dissimilar metals must not be connected such the direct contact between dissimilar metal occurs. This includes copper, aluminum, etc.

The required clearances and access around and above all electrical equipment must be maintained.

SERVICES, OUTSIDE FEEDERS, AND OUTSIDE BRANCH CIRCUITS

The service rating should be adequate for the loads imposed by the dwelling. Calculating the loads is technically exhaustive and beyond the scope of a general property inspection. Personally, I feel that obvious sizing issues should be noted. For example, a 100 Amp

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service panel serving a 3,000 square foot property is may prove inadequate for our electricity dependent life-style.

The service entrance weather head and wiring should be evaluated to ensure that it is properly secured, free from indications of damage or deterioration. Any exposed service entrance wiring should be inspected for indications of UV damage. The CEC 2016 specifically addresses this issue and requires the wiring to be UV rated or properly protected. The service entrance wiring should be installed with proper clearances to the roof, dwelling, openable windows, walking surfaces, etc. For the most part, the CEC does not govern service entrance clearance issues. The Public Utilities Commission (PUC) determines service clearances. The local utility will publish the PUC requirements. In areas served by PG&E, the "Green Book" details all utility service access/clearance requirements in PG&E's service area. All utility providers will have a similar document.

Service-entrance raceways and cables should be terminated with fittings or connectors that are approved for the type of raceways, cables, and environmental conditions. The service-entrance equipment should be readily accessible and have the required access and working area. The working area should be maintained to allow ready and safe operation and service. The service-entrance equipment, cables, raceways, or conductors should be inspected for evidence of physical damage, overheating, corrosion, or other deterioration.

The service equipment must be properly grounded. The grounding electrode conductor must be properly sized and terminated. The grounding electrode conductor should be connected to a minimum of two grounding electrodes that provide a low impedance path to the earth. The grounding system must have the current carrying capacity to prevent the buildup of voltages that would result in undue hazard to connected equipment or to persons. All building metal systems;

i.e. as water piping, gas piping, etc. must be bonded to the electrical service grounding system.

GROUNDING ELECTRODE CONDUCTORS

The grounding electrode conductor or bonding jumper connection to the grounding electrode must be made in a manner that will ensure a permanent and effective grounding path. Verify that the grounding electrode conductor is properly connected to the grounding electrode and that components show no visible evidence of physical damage or deterioration. The grounding electrode conductor must be protected against physical damage. Metal enclosures/conduits providing physical protection of the grounding electrode conductor should be bonded at each end to the grounding electrode conductor. The grounding electrode conductor should be continuous unless specifically permitted to be spliced or joined. Any splices should be made using permanent/approved means. Any tap ground conductors connected to the grounding electrode conductor should be connected in such a manner that the grounding electrode conductor remains continuous without a splice. The dwelling intersystem bonding system, i.e.; communications, CATV, and satellite, must be bonded to the main electrical grounding. The intersystem bonding wire should be independent and not an extension of the grounding electrode conductor.

PANELBOARDS AND DISTRIBUTION EQUIPMENT

It is important that panelboards and distribution equipment be readily accessible. The required access and working space and overhead clearances should be provided and maintained to permit safe operation and maintenance of the equipment. No storage is permitted in the dedicated service area. The panelboards and distribution equipment should be inspected for evidence of physical damage, overheating, corrosion, or other deterioration. All cables or conduits entering the equipment shall

be fastened with approved connectors. All connections should be tight. Any unused openings must be sealed/closed using a means that is equivalent to the characteristics of the panelboard or distribution equipment. All metal parts must be effectively grounded or bonded using approved fittings. All dead-front covers, partitions, or parts of the enclosure should be properly installed to ensure protection from live parts. The dead-front covers should be listed for the panelboard they are installed on. The fasteners securing covers should be intended for that purpose and with the panel.

The labeling for all disconnecting means should conform to the following:

- 1) All disconnecting means for motors and appliances, and each service, feeder, or branch circuit at the point where it originates, should be legibly marked to indicate its purpose unless located and arranged so the purpose is evident.
- 2) The marking must withstand the environment involved.
- 3) The designations should not be subject to change over time; i.e. the blue bedroom versus the northeast bedroom.

OVERCURRENT PROTECTIVE DEVICES

All overcurrent protective devices should be rated for the conductor protected and the conditions of use. The overcurrent protective devices should be inspected and must not show evidence of physical damage or overheating. All connections and terminations at the overcurrent protective devices should be tight but not over-tightened and must not show evidence of corrosion or heat damage. The wire size should not be too large for the overcurrent protective device terminal. Most overcurrent protective devices are designed for wires no more than one standard size larger than the device ampacity rating. The overcurrent protective devices must be listed and used/installed in accordance with the instructions included in the listing and

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or labeling. Overcurrent device should be listed for use in the panelboard they are installed in. Where there is evidence of over-fusing or tampering with Edison-base fuses, then properly sized Type-S non-tamper adapters and fuses must be installed.

CABLES, CABLE ASSEMBLIES, AND CONDUCTORS

The inspector should verify that all exposed cables and cable assemblies are properly supported to prevent physical damage to the assembly. All cables and cable assemblies entering a panelboard, box, or device should be properly secured and supported as required. This is to ensure that any stress is not transmitted to the conductors and termination(s).

All conductors must be terminated as required at panelboards, devices, boxes or using approved means. The connections must be properly tightened, but must not damage the terminal lugs or the conductors. Only one conductor should be terminated at a terminal unless the terminal is listed for multiple conductors. All splices and taps should be made inside a box/enclosure or using other approved means. The inspector should verify that the conductor size is adequate for the overcurrent rating of the circuit protection device. Special exceptions may apply to specific types of utilization equipment such as air conditioning condensing coils, etc. Cutting strands from conductors to make them “fit” in a terminal is improper. Verify that visible splices and taps have been made using an approved method.

Visually inspect exposed conductors, cables, and cable assemblies for evidence of overheating or deterioration. The conductors, cables, and cable assemblies should not show evidence of fraying, damage, or physical abuse. Type AC and NM cable should not be installed in damp or wet locations.

All grounded conductors (neutrals) that are 6 AWG or smaller must have white or gray colored insulation. The

use of marking tape on ungrounded conductors larger than 6 AWG is allowed. No other conductors may be identified using white or grey colors. Except as provided for elsewhere, no ungrounded conductor can be connected to a non-current carrying component after the main panel (neutrals must “float”). Where the appliance circuit for an electric range, cooktop or electric clothes dryer does not include a circuit ground, ungrounded conductors may be connected to appliance cases where all 4 of the following are true:

- 1) The circuit is a 120/240 VAC, 3-wire and is single phase.
- 2) The grounded conductor is at least 10 AWG copper or 8 AWG aluminum.
- 3) The grounded conductor is insulated or is uninsulated and part of an SE cable that originates at a main panel.
- 4) Where the appliance/equipment supplied receptacle grounding contacts are bonded to the case.

Circuit grounding conductors may be bare, covered or insulated wire. Where covered or insulated, the color must be green or green with one or more yellow stripe. Ungrounded or grounded (hot and neutral) conductors must never be identified using green or green/yellow stripe colors.

FLEXIBLE CORDS AND CABLES

Flexible cords and cables should never be used as follows:

- 1) As a substitute for the permanent/ fixed wiring system
- 2) Routed through holes in walls, ceilings, floors or other concealed spaces
- 3) Run through doorways or windows, under carpets, etc.
- 4) Attached to building surfaces

Flexible cords or cables are never a substitute for permanent/fixed wiring to supply outlets in rooms. The inspector should report any improperly installed flexible cords or cables and recommend

removal. Where permanently installed receptacles, luminaires, etc. are required, the installation of approved wiring methods should be recommended.

RACEWAYS

The inspector should verify that all conduits, raceways are properly fastened in place. All raceways should be properly terminated using fittings or connectors that are listed for the specific wiring method with which they are used. Inspect all raceways for evidence of deterioration or physical damage.

PERMANENTLY CONNECTED LUMINAIRES (LIGHTING FIXTURES)

The visible portions of the supply conductors for all luminaire (lighting fixture) taps and branch-circuits should be inspected for evidence of damage or deterioration from overheating, corrosion, etc. The luminaire canopies should be properly fastened in place/secure. Where identified, luminaires must be lamped in accordance with the manufacturer’s instructions. The lamp installed must not exceed maximum wattage ratings on the fixture. Over-lamped fixture may shut off when left “ON” for a period of time. This can be the fixtures thermal protection kicking in. Where a luminaire tap conductor or terminals and branch-circuit conductor are identified for polarization, luminaire connections must be correctly polarized.

POLARIZATION OF LUMINAIRES

Where visible, ensure that the luminaire is wired so that the screw shell of the lampholder is connected to the same luminaire or circuit conductor or terminal. Where the grounded conductor is connected to a screw-shell lampholder, it should be connected to the screw shell.

Luminaires must not be connected to wiring with a lower temperature rating than the fixture requires. Generally, modern luminaires will require a minimum of 90 °C wire. Older wiring,

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such as knob & tube wire is typically rated at 60°C. Connection to lower temperature wiring may result in heat damage to the insulation and poses a fire-safety risk.

Open or partially open incandescent lamps should not be installed in clothes closets. Luminaire used in closets should be listed for closet use. Most halogen lighting, cable lighting, track lighting are not listed for use in closets.

Non-insulation contact recessed lights require a minimum of 3-in. clearance to insulation. The trim kit installed on a recessed light can alter the IC rating. Even if a recessed light is marked as IC-rated, the trim kit used can make it a Non-IC rated fixture. The presence of an IC rated label does not guarantee it is IC rated. All luminaires used in wet locations must be identified for use in wet locations.

BOXES AND ENCLOSURES

All visible enclosures should have box covers and the covers should be properly fastened in place with appropriate screws. All boxes, covers, and enclosures installed in wet locations should be specifically identified for use in wet locations. The boxes and enclosures installed in damp locations should be placed or equipped to prevent moisture from entering or accumulating in the enclosure.

Any unused openings in boxes or enclosures must be sealed using means that meets or exceeds the characteristics of the box or enclosure. Where an equipment-grounding conductor is installed, any non-current-carrying metal parts that are likely to become energized must be effectively grounded.

Where the walls and ceilings constructed of wood or other combustible surface material, all boxes must be installed flush with or project from the finished surface. Any gaps between the box and the plaster, drywall, or plasterboard surfaces should be an 1/8” or less from

the edge of the box or fitting. Gaps over 1/8” should be repaired.

GENERAL-USE SWITCHES AND RECEPTACLES

Verify that the accessible enclosures are properly fastened in place. All receptacles and switches should have faceplates installed. The faceplates should not be damaged or show indications of overheating. Any conductor connections that are visible should be tight and not show evidence of arcing or overheating. Loose connections may also be evidenced by faceplates that are discolored or warm/hot to the touch. All switches and receptacles should be properly fastened secured and should not exhibit evidence of overheating or physical damage. Physical damage should not impair the safe operation of switches and receptacles. Any switches and receptacles that have been painted or have other coatings applied should be reported and replacement recommended.

Receptacle wiring should comply with the following:

- 1) Receptacles should have proper wiring when tested with a listed receptacle tester. The tester shall provide indications when branch circuit conductors are not connected to the intended terminals on the receptacle.
- 2) Where receptacles and branch-circuit conductors are identified for polarization, any installed receptacles must be properly polarized.
- 3) Any receptacles that do not appear to make proper contact with the plug blades/have impaired retention should be reported and replacement recommended.
- 4) All grounding-type receptacles must be properly grounded. Circuits that do not have an equipment-grounding conductor should use a ungrounded receptacle or should have a ground-fault circuit-interrupter (GFCI) protection installed. Any GFCI receptacles installed in ungrounded circuits should be marked “No Equipment Ground” on the faceplate.

- 5) All switches should be rated for the connected load. Standard dimmers used to control wall receptacles are almost always improper. Standard dimmers are typically rated for maximum load of 600-900 Watts. A receptacle on a 15 Amp circuit can draw 1800 Watts. Standard dimmers should be replaced with switches rated for the load.
- 6) The grounded conductor (neutral) on a branch circuits should not be switched unless both grounded and ungrounded conductors are simultaneously broken. On a standard circuit tester, we may see an open neutral condition when a switched receptacle is in the “OFF” position. This receptacle may test properly with the switch in the “ON” position. In that case, the neutral is improperly being used as the switched leg of the circuit.

MISCELLANEOUS APPLIANCES AND SPECIAL EQUIPMENT; INCLUDES GROUND-FAULT CIRCUIT INTERRUPTERS, SMOKE ALARMS, APPLIANCES AND UTILIZATION EQUIPMENT, ARC-FAULT CIRCUIT INTERRUPTERS, CEILING-SUSPENDED (PADBLE) FANS

- 1) CREIA SOP’s exclude testing Ground-fault circuit interrupter (GFCI) function. The inspector should indicate that GFCI protection is installed where required or recommend appropriate upgrades. Should an inspector make the business decision to test GFCI device operation, this should be done using the integral test function. Generally, the manufactures do not recognize external testing devices as valid. When testing with the internal test function, verify that the receptacles deenergizes when tripped.
- 2) CREIA SOP’s exclude testing the Arc-fault circuit interrupter (AFCI) function. The inspector should indicate that AFCI protection is installed where required. Should an inspector make the business decision to test AFCI device operation, this should be done using the integral

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test function. There are test devices labeled for AFCI testing. None are approved by UL. The inspector should attempt to verify the AFCI breakers are compatible with the enclosure; i.e. Murray AFCI's should not be installed in a Square-D panelboard. Current generation Combination Type AFCI's are a significant improvement over the first-generation Branch Feeder AFCI's. The inspector may choose to recommend the upgrade of older branch-feeder AFCI's to current combination-type AFCI's as a property upgrade. When testing with the internal test function, verify that the circuit deenergizes where tripped if possible.

- 3) When a convenience receptacle is replaced in an area that now requires AFCI protection, that circuit must be upgraded to include AFCI protection. Current (2016 CEC) standards require AFCI protection for all interior lighting, receptacles and smoke alarm outlets in general living areas, bedrooms and kitchens.
- 4) The CREIA SOP's exclude testing smoke alarms and only requires that the absence of smoke alarms be noted. The inspector may indicate that smoke alarm protection is installed where required or recommend appropriate upgrades. Each inspector make the business decision to test smoke alarm function. I suggest testing using the integral alarm test function only. The internal test is the only test recommended by the manufacturer and approved under the UL 217 standard.

Some inspectors may generically refer to smoke alarms as smoke detectors. A smoke detector contains a sensor only and has no built-in horn or integral power source. Smoke detectors are used in central systems. A smoke alarm has both the ability to sense smoke, an audible alarm and power source. Smoke alarms should be replaced

when they fail to respond when tested, when the end-of-life alarm activates or where they are over 10 years old.

New battery-only smoke alarms should have 10-year non-removable batteries and a 10-year end-of-life clock. Hard-wired smoke alarms must be replaced in kind. The integrity of the alarm interconnection must be maintained.

- 5) CREIA standards exclude testing CO alarms and only requires that the absence of CO alarms be noted. The inspector may indicate that CO alarm protection is installed where required or recommend appropriate upgrades. Carbon monoxide alarms should be replaced when they fail to respond using the manufacturers built-in test function, when the end-of-life alarm activates or when the exceed the manufacturers stated life span.
- 6) Combination smoke/carbon monoxide alarms should be replaced if they fail to respond when tested, when the end-of-life signal activates or where more than 10 years from the date of manufacture/past the stated life span.
- 7) All appliances and utilization equipment should have a disconnecting means within line of sight or use an approved lockout device. The appliance disconnect should be readily accessible and should de-energize all ungrounded conductors. If a protective device rating is marked on an appliance, the branch circuit overcurrent device rating shall not exceed the protective device rating marked on the appliance. All cables entering the appliance/equipment should be fastened with an approved connector. Any non-current-carrying metal parts should be effectively grounded.
- 8) It is important that all ceiling-suspended (paddle) fans be properly supported. Ceiling fans are often installed in existing lighting outlets (boxes). Verifying the adequacy of the fan support is beyond the scope of a property inspection. I would

suggest disclaiming the integrity of connections and recommending that they be further evaluated.

Many of the recommendations in NFPA 73 are beyond the scope of a general property inspection. Still, there are aspects that fall within the scope of the CREIA SOP's. No doubt, many of us already do some of this without even realizing it. The intent of this article is not to expand the scope of an inspection as defined in the CREIA Standards of Practice. It is to look at the areas we already inspect and develop a "Best Practices" approach to the inspection process. By careful integration of the lessons learned from NFPA 73 into our own inspection protocol, we should be able to increase the effectiveness of our electrical system evaluations and enhance the general safety of the properties we inspect.

Skip Walker, is a CREIA Master Inspector, an ASHI Certified Inspector, an ICC Certified Combination Residential Building Inspector, an ICC Certified California Residential Building, Mechanical and Plumbing Inspector, a FIRE Certified Fireplace Inspector and co-author of the Code Check© series. He has presented at various local, state regional and national inspection 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, the 2014 ASHI President's Award, the 2014 CREIA John Daly Award and the 2011 CREIA Inspector of the Year. Skip's home has ONLY photoelectric alarms installed. You may reach Skip by email at: homeinspection@sanbrunocable.com

How to Raise Your Price Without Killing Your Business – Part 2

BY ALAN CARSON, CARSON DUNLOP,
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In Part 1 of this article, we introduced the reasoning behind raising your prices to grow your business. We discussed this in terms of pricing versus volume and a concept called price elasticity. In Part 2 of this article, we turn our attention to what it means to have prestige pricing, as well as the reaction from real estate professionals from price increases.

PRESTIGE PRICING

Prestige pricing refers to a strategy that convinces a client that a product or service is as high quality as the price tag suggests. This strategy is also called price signaling. The price signals the quality. Even if the quality of a product is low, the high price encourages people to buy it anyway. Cosmetics present the classic example for price signaling. Inexpensive cosmetics don't sell well. If you make cosmetics, don't worry about who or what it was tested on, just make it expensive and it will sell!

Every marketing textbook has the story about the store that can't unload their overstock of widgets. They are priced to sell but no one will buy them. Due to a miscommunication between management and staff, an employee raises the price of the widgets by 50 percent. Suddenly they start selling like hotcakes.

In the home inspection industry, the combination of prestige pricing and the inspection's highly intangible nature means the demand is not only inelastic, but sometimes, there is an inverse relationship between price and business volume. Depending on where you sit in the market, you may find that raising your prices increases your business volume.

AGENT REACTION TO PRICE INCREASES

Prospective customers don't generally have a problem with inspectors raising their prices periodically. Our experience, however, shows that some real estate agents react with temporary sticker-shock each time inspectors raise their prices. Although your prospective clients won't perceive anything out of the ordinary in your pricing (because they have never had a home inspection before), the agents know how much you charged previously.

The agents like to look good to their client. If the agent refers a home inspection company, and the client finds out that a different company charges \$50 less, the client might wonder why the agent did not tell them about that option. The agent wants to be the one who gets a good deal for their clients on all fronts related to the house transaction.

KEEP YOUR AGENT IN THE LOOP

The agent looks uninformed and sloppy if they tell their client that you charge \$375 and you subsequently tell the client the price is actually \$450. The agent's frustration with you is understandable. They are trying to look well connected and on top of the transaction. If you don't keep the agents up to date, you have hurt their ego, and possibly their pocketbook, if they lose the client's confidence. It's an issue of trust.

KEEP AGENTS' PERSPECTIVE IN MIND

Educate the agent about your pricing. Remember, agents don't have to think in terms of increasing their fee because they generally get paid a percentage of the selling price. This pricing strategy guarantees that they always stay in step with inflation. In addition, though their commission is negotiable, the range is more or less within an industry standard. In short, agents do not function in the same world or in the same way as professional service providers who compete with other professional service providers. They don't rely on pricing strategies as a marketing tool that gets them a bigger piece of the pie. Some real estate organizations do use reduced rates as their marketing strategy. But these companies are the exception rather than the rule.

Whatever the cause of the backlash over prices from the agents, experience shows that it's temporary. If the agents are loyal, and are referring business to you, they will continue to do so in spite of your increased fees, as long as you keep them in the loop.

EXPERIMENT WITH PRICING

Why not experiment with increasing your prices? You have little to lose and a whole lot to gain. You can always go back to your original pricing, but you'll never know what it's like to earn more and work less, unless you raise your prices. But don't forget to keep everyone in the loop, except, of course, your prospective client. They didn't know what you charged before, so why inform them of a price increase?

In the end, your goal should be separate yourself as a service which is a commodity. Not all home inspectors are the same. Better lawyers charge more. Better accountants charge more. Why not home inspectors? This means that you do have to be better. By charging more money, you have extra time to increase your skill sets as well as marketing efforts to a target customer that are more focused on quality service instead of simply a lower price.

Good luck on your efforts!



SKYLIGHTS

BY ALAN CARSON, CARSON DUNLOP,
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Skylights are popular architectural features in homes, on both flat (low sloped) and sloped (steep) roofs. They may be single, double or triple glazed, and may have flat or curved glazing. Skylights may be installed on curbs, or may be flush mounted. Most templates are manufactured units, but they may also be site built.

Skylights installed in cathedral ceilings or flat roofs don't usually need light wells to get to the ceiling level. Skylights installed on steep roofs often have large wells around the skylight extending down through the attic to the ceiling level. These wells often widen as they get closer to the ceiling to allow better light distribution.

A WORD ABOUT GLAZING

The glazing may be glass, polycarbonate, fiberglass or acrylic. Some are a combination of these. There are many types of glass used for skylights. Because they are not vertical like windows, they need to be stronger. Glass may be tempered or laminated, both of which are stronger than regular glass. Some manufacturers offer a hybrid with laminated glass on the inside and tempered glass on the outside. Laminated glass stays cleaner and is more noise resistant than tempered glass. Glazing may be Low E and gas filled for improved energy efficiency.

THE CHALLENGES

Skylights are more susceptible to problems than windows for several reasons. Since they are not vertical, they are more exposed to rain, wind, hail, and in some climates - snow and ice. Skylights are more likely to catch and hold water. They also see far more direct sunlight, including ultraviolet light, than windows. Now, let's look at some common skylight problems.

PROBLEMS TO WATCH FOR

COMMON PROBLEMS INCLUDE –

1. Leaks - As always, water is the #1 enemy of homes.
2. Rot - Typically from long-term minor leakage; often concealed in the framing system.
3. Mechanical damage - Animal damage and falling branches are common culprits.
4. Patches - Evidence of previous repairs is a red flag.
5. Cracked or broken glazing - These may be caused by mechanical damage, structure movement or thermal stresses
6. Loss of seal on double-glazed units

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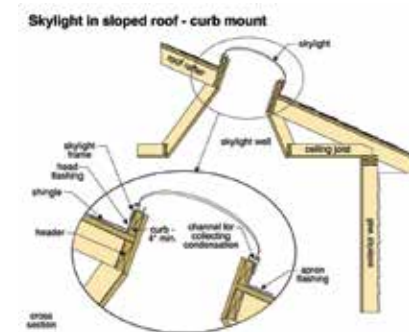
7. Installation problems, including
 - a. No curb or low curb - although some are designed this way
 - b. Improper or incomplete flashings
 - c. Wrong application (e.g., a system designed for steep roofing is installed on a flat roof or vice-versa; a system designed for asphalt shingles is installed on a tile roof)
 - d. Window is used as a skylight
 - e. Skylight is poorly secured to the roof

INSPECTING SKYLIGHTS

As always, water is the issue. Skylights should be inspected from above and below, as well as from the attic, if possible.

On the exterior, inspectors look for a curb and proper flashing details. On sloped roofs, the area above the skylight should be checked carefully for evidence of water collecting there. Ice damming around skylights is a common cold weather issue. The glazing should be checked for damage- and the area around the skylight for evidence of previous repairs. Roofing cement or caulking on a skylight is a temporary repair at best. Inspectors can lift up (gently) on skylights to ensure they are well secured.

From the interior, we look for stains and damage to the ceiling or skylight well finishes. We use a pin-less moisture meter (beyond ASHI® Standard of Practice) to help determine whether the problem is active. If it is wet, the problem is active. If it is dry, it is inconclusive. Even if it shows dry in the summer, it may be active in winter due to ice damming. If it is dry in winter, it may be wet during spring or summer rains.



Condensation may also be an issue, especially in bathrooms and kitchens in cold climates. Many skylights have an interior tray around the perimeter to collect condensation. Trays may leak or overflow. Condensation problems often look like leaks. Allow for both possibilities in your report where appropriate.

IMPLICATIONS

Leaking skylights can damage interior finishes, but can also cause rot and mold in concealed areas, and can damage the structure.

INSTALLATION PROBLEMS

You should be looking for skylights that are not installed according to manufacturer's recommendations. It is helpful to become familiar with the type of skylights that are commonly used in your area, and obtaining the installation instructions for each of these. Local home shows are a good spot to pick up this information.

While you won't be able to see all of the installation details once the skylight is on the roof, if you know how it was supposed to have been installed, you will be able to recognize some of the installation problems. For example, if it was supposed to have a curb and does not, you'll be able to pick that up. If the curb is not high enough, you'll be able to determine that. If the flashings are incomplete or the wrong flashing kit has been used for a tile roof, for example, you may be able to determine that.

LIFT UP ON THE SKYLIGHT

If you are on the roof and can get to the skylight, you should grab the edge and see if you can lift it off the roof. Be careful here! Don't lift too hard. If the skylight starts to move, you can describe it as being poorly secured without having to lift it all the way off.

STRUCTURAL ISSUES

Before you go inside to check for evidence of leakage, you should put weight on the framing members around the skylight to ensure that there is no excessive deflection. In some cases, cut structural members are not adequately re-supported. In other cases, slow leaks can cause rot damage to framing members, weakening the structure in the area of the skylight.

IDENTIFYING THE CAUSE OF THE LEAK

In most cases, it's not possible to find out where the skylight is leaking. Since most of the installation details are concealed from view, you usually can't pinpoint the weak link. In some situations, the "leak" may actually be condensation. Condensate trays and drains may become clogged, preventing the condensate from discharging outside. This can look like a leak, but will typically be only a winter problem, which is when most condensation occurs. Ice damming is also a winter-only problem.

GOOD, FAIR, POOR

Here is our ranking of skylight types:

1. Curb mount: Good
2. Integral curb: Fair

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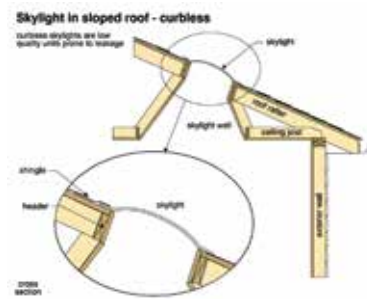
3. Flush mount: Poor

We'll look at each one.

1. CURBS PREFERRED

We have found that skylights set on wood curbs are the most successful. Curbs should be a minimum of 4 inches high on sloped roofs and 8 inches on flat roofs. Curbs should be installed and flashed independently of the skylight. Different roofing materials require different flashing systems.

The skylight is simply set onto the top of the curb, and screwed into place. The skylight may have a gasket to ensure a tight fit on the curb.



The illustration to the right shows a double glazed curb mounted skylight on a sloped roof with a 4-inch curb. It shows a head flashing at the top, and an apron flashing at the bottom. There would be step flashings and counter flashings along the sides, just like a roof/sidewall flashing system.

The photo below shows the bottom corner of a curb mount installation. There is a self-adhering modified bitumen membrane ('ice and water shield') on the roof surface, which runs up the sides and over the top of the curb. You can see the step and counter flashings on the side. The frame is set on the curb and screwed onto the curb from the sides. You can also see the curved double glazed acrylic panes.



A curb mounted skylight

The skylight in the photo below is flashed into the concrete tile roof with lead flashing. Irregular roofing materials require a different approach. Many skylights have proprietary flashing details for different roofing materials.



Skylight on tile roof

CURBS DONE WRONG

Although we like skylights on curbs, the installation still has to be good. A skylight on a curb is like a short chimney, and it should be flashed the same way. The photo below shows an incomplete installation with step flashings, but no counter flashings. The wood curb is visible above the flashing and below the skylight. This also reveals the fact that there is no self-adhering underlayment on the sides of the curb.



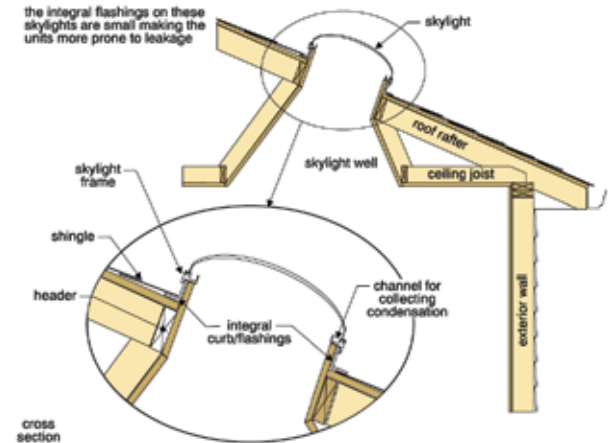
Incomplete flashing

2. INTEGRAL CURB

The integral curb skylight is a hybrid between the curb and flush mount approach. The illustration below shows how the raised skylight frame sits on the roof. The frame typically has an apron that sits flat on the roof. A self-adhering modified bitumen membrane covers the apron.

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Skylight in sloped roof - integral curb (self-flashing skylight)



The photo below is an integral curb skylight. Note the white apron and the self-adhering modified bitumen underlayment, which seals it. There is no step or counter flashing here, although some systems use them.



A integral-curb skylight installation

The side flashings may be step flashings interwoven with the roofing material. The counter flashings ideally extend onto and are secured to the top of the curb.

The photo below shows a problem at the top of the skylight, where the roofing material is incomplete. This creates a vulnerable spot in a critical location.

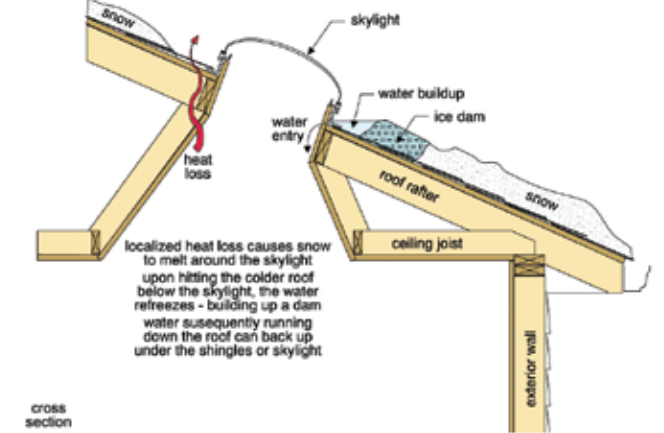


Roofing material missing

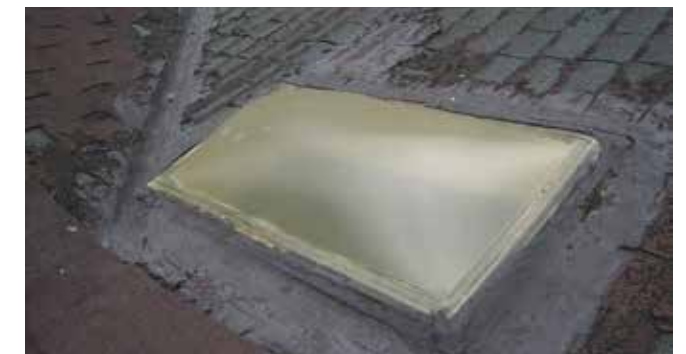
3. FLUSH MOUNT

We have mentioned our preference for curbs. The illustration below shows a flush mounted skylight. These skylights are more prone to leakage in our experience.

Ice damming at skylight



The skylight below has failed and endured temporary repairs, which were not successful. The acrylic glazing has discolored. The good news is the roof needs to be replaced, presenting a good opportunity to replace the skylight and then make interior repairs. By the way, is there any chance the valley flashing has been an issue as well?



A skylight in distress

GENERAL COMMENTS

Now we will look at some issues that apply to all skylights

CHECK THE GLAZING

Look carefully at all of the glazing for cracks or movement within the frame. Remember that many skylights are double or triple glazed and you have to look at each piece of glazing. Observe whether the edges of the glazing are set in a gasket or terminate in a tray that allows for condensation to drain. Sealed units should never have condensation, while the

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vented and drained skylights will have condensation from time to time.



Look carefully – cracks are easy to miss



Sealed units should not have condensation

PATCHES

Most skylights leak eventually. If you see evidence of patching on the outside, you can assume that the skylight has leaked.



Patched at top

WINDOWS USED AS SKYLIGHTS

Watch for windows that are used as skylights. Windows should be vertical. Some people say that windows should be completely vertical. Many authorities require that any glass more than 15° off vertical must be strengthened by tempering, laminating, wiring, annealing or equivalent.

This is one of the reasons that acrylic may be used rather than glass on skylights. Strengthening glass is fairly expensive. The acrylic is strong, although it does scratch easily.

You often won't be able to tell if the glass in skylights is appropriately strengthened. If you can get a manufacturer's name and model number, this will allow you to get an answer. Some tempered glass says tempered in the corner of the pane. If in doubt, don't guess. Simply tell your client you can't verify that the skylight has the proper safety glazing. Standards don't require you to identify it.

GO INSIDE THE BUILDING

From the interior of the building, look for evidence of leakage, particularly at the bottom corners of the skylight opening. A stepladder often provides a better view.



Look from the inside for damage and leaks

BE CAREFUL

Almost all skylights will leak eventually. Problems may be concealed by recent decorating. We suggest you let your clients know that these are susceptible to leakage.

LIGHT WELLS OR TUNNELS

Skylights installed on steep roofs often have large wells around the skylight extending down through the attic to the ceiling level. We saw that in the first illustration in the article. These wells often widen as they get closer to the ceiling to allow better light disbursement. Skylight wells should be insulated, and in cold climates, there should be a vapor barrier on the warm interior side of the well.

SUMMARY

In this article, we have introduced skylights and some of the common issues.

Earth Grounding System

BY ALAN CARSON, CARSON DUNLOP,
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Electricity is confusing enough when we deal with wires that are supposed to carry the current. It's even more confusing when we talk about wires that normally don't do anything at all. Most people have some difficulty with the concept of **grounding** and its cousin, **bonding**. We'll try to keep it simple and take away the mystery.

The good news is that it is not a very complicated or time-consuming part of your inspection. The better news is that repair or replacement is usually not expensive.

TWO TYPES OF GROUNDING SYSTEMS

There are two types of grounding in homes, with different functions. The **equipment grounding system** is the

network of bare, uninsulated wires that run through the home as part of residential branch circuit wiring installed since the 1960s. Equipment grounding systems connect to the transformer on the street and protect homeowners against electrical shock from stray electricity in the home. The **earth grounding system** connects the house electrical system to the earth. For this discussion, we will focus on the latter.

CONNECTS SERVICE BOX TO EARTH

The earth grounding system uses a wire to connect the service box to the earth with water pipes, grounding rods, etc. This is a path for lightning or static electricity. It is not intended to carry the emergency current from the equipment grounding system to ground. The only

time this earth grounding system would carry electricity from the home would be if there was a fault in the home causing current to flow through the ground wires in the distribution system **and** the neutral service wire out to the street was broken.

LIGHTNING

Earth grounding systems help carry unexpected electrical charges from other sources away safely. For example, lightning strikes can energize components in houses. The earth grounding system can sometimes safely dissipate electricity from lightning. However, large lightning strikes will not be dissipated by a house grounding system.

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STATIC CHARGES

Earth grounding systems also help to dump static electrical charges. The buildup of static electricity within electronic equipment, such as home computers, can create operational problems. This is a much less important function of the grounding wire, protecting equipment rather than people.

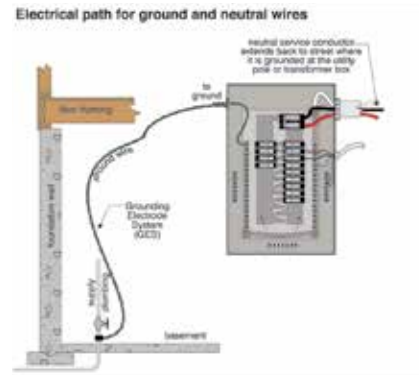
GROUNDING (GROUND) VERSUS GROUNDED

To summarize, there are two grounding systems in the home. The equipment grounding system is an emergency backup to the neutral wires in the distribution system. The earth grounding system protects against lightning and helps eliminate static charges.

Let's make sure we understand the difference between the grounding (ground) wire that we've been talking about and the grounded neutral wire. The white neutral (grounded) wire carries current on an everyday basis as part of a normal circuit.

The electricity flows through the neutral wires and is collected at the neutral bus bar in the distribution panel. It then flows to the neutral connection in the service box and is joined to the neutral service entrance wire. This neutral service wire then goes out to the transformer at the street. This is the way electricity is supposed to flow.

Electricity is supposed to flow through the white neutral (grounded) wire; it is not supposed to flow through the bare ground wire. The ground wire is normally at rest, available for emergency use only. If something goes wrong, the ground wire will carry electricity safely to the neutral service wire at the service box.



GROUNDING TERMINOLOGY

GROUNDING ELECTRODE CONDUCTORS

We'll refer to the **earth ground wire**, which is the bare wire that connects the service box to the grounding rods or water pipes. It is technically called the **grounding electrode conductor**. Many people just call it the **ground wire**.

EQUIPMENT GROUNDING CONDUCTORS

The ground wires on each branch circuit throughout the house are called **equipment grounding conductors**. We'll just call them ground wires.

BRANCH CIRCUIT GROUND WIRES

We won't deal to any great extent in this section with the equipment grounding wires that are found in the distribution systems of modern electrical systems. We'll talk more about branch circuit grounds when we talk about the branch circuit wiring. Up until the late 1950s, most houses didn't have equipment-grounding wires in their distribution wiring anyway.

Ground wires/earth grounding conductors

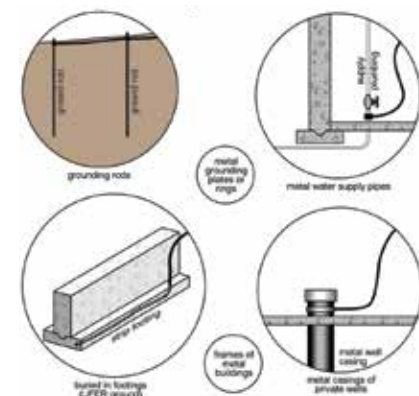
Ground wires are typically copper and maybe bare or insulated. They are typically 8 gauge for 100 amp Services and 6 gauge for 200 amp services. It is best practice to avoid splices in a ground wire, since every splice is a potential poor connection.

Where does the grounding system end?

The goal is to get the electricity to flow to ground. This done by connecting the earth ground wire to a grounding electrode. There are several ways to do this, including –

1. through metal water supply pipes
2. through metal rods driven into the ground
3. through wires (often ½-inch reinforcing bar) buried in the footings of buildings (UFER ground)
4. buried grounding plates or rings
5. the frames of metal buildings (more common in commercial than residential construction)
6. the metal casings of private water supply wells

The illustration below shows the most common grounding electrodes used.



A typical connection to a ground rod (although the part of the clamp in the foreground is installed backwards)

You will not be able to see the entire earth grounding system. However, there are a few things to look for,

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mostly around what's missing or poorly connected.

Let's look at what goes wrong with earth grounding systems. The implications are the same throughout. An ineffective or missing earth grounding system cannot perform its safety functions. There is greater risk of electrical shock, fire and equipment damage in houses where the earth grounding system is not effective.

1. No grounding
2. Ground wire attached to plastic pipe
3. Ground wire after (downstream of) meters and valves, with no jumper
4. Spliced ground wire
5. Ground wire attached to abandoned pipe
6. Poor connections
7. Ground connections not accessible
8. Ground rod cut off
9. Corroded ground wire
10. Undersized ground wire

We'll discuss three of the most common conditions with earth grounding systems

NO GROUNDING

A missing earth grounding conductor (wire) is a result of improper installation. If it is missing, recommend immediate improvements. Clients, real estate agents and homeowners may have a tough time understanding how this is important since the house has been operating this way for a long time. Explain that this is an emergency safety system and houses can operate for years without it, but the one time they need it, they won't have the protection they should. The good news is it is typically not an expensive improvement.

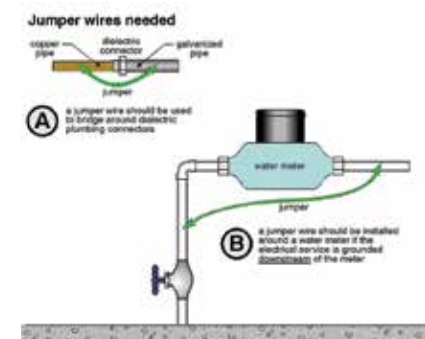


There is no ground wire coming out of the main disconnect part of this panel

GROUND WIRE DOWNSTREAM OF METERS AND VALVES WITH NO JUMPER

Make sure the ground wire is connected as close as possible to the plumbing service entry and upstream of (before) any devices that might interrupt it. Where there are devices such as meters or pressure regulators upstream, a jumper should be added around the devices, or the ground wire should be moved upstream of these. The jumper should be the same size as the ground wire and clamped securely to the metal pipe.

Metal natural gas piping must be bonded to the grounding system. This applies to new installations, or updates involving gas piping or electrical service work. It is common to find this bonding wire connected to the plumbing system at the water heater, where the gas and water pipes are close together. In this case, a jumper may be needed around the water meter to maintain continuity of bonding for the gas piping (although the electrical system may be properly grounded without this jumper).



A jumper wire is needed here

LOOSE OR POOR CONNECTIONS

Loose or poor connections are caused by such things as –

1. poor installation
2. vibration
3. corrosion

The ground wire (earth grounding electrode) is typically connected to the service box at one end and to a pipe and/or ground rod(s) at the other. Make sure the wire is securely fastened at both ends. Where ground wires are attached to pipes, it's not adequate to just wrap the wire around the pipe. The wire must be secured with a clamp approved for that purpose.

The wire should be tight in the clamp and the clamp should be tight on the pipe. Corrosion of the wire, clamp or pipe can result in poor connections. Where you see this, recommend further investigation or improvement as appropriate.

SUMMARY

We have introduced earth-grounding systems in this discussion, and touched on some of the common issues. More information regarding other conditions, their causes, implications and strategies for inspection can be found in the ASHI@HOME training program.

ANNOUNCEMENTS

CREIA's 40 Most Influential People in the Inspection Profession recognized at CREIA's 40th Annual Conference, which was held in September, 2016.

Larry Aguilar, Terry Brown, Michael Cantor, Michael Casey, Scott Clements, John Daly*, James Farmer*, Perry Farnum, Bob Fennema, Andy French, Craig Funabashi, Jack Girona, Brian Hannigan, Douglas Hansen, George Harper, Sam Jabuka, Steve John, James Koepfel, Joey Lee, Stan Luhr, Geoff Lunt*, Jerry McCarthy*, Duane McCutcheon, Robert McManus*, Neal Muckler, Greg Noyse, Kevin O'Malley, David Pace, Dennis Parra Sr., Gene Prowitzer*, Bob Reed*, Roger Robinson*, Mike Schindler, Gary Sniffin, Scott Swickard, Carl Turnbow, Jim Turner, Al Virtue, Peter Walker, Skip Walker. (*deceased)



Congratulations to the following CREIA Chapters!

The following chapters were awarded PR Grants for 2016-2017 fiscal year to be used for exhibiting and other public relations activities.

DELTA CHAPTER

- Central Valley Association of Realtors – events and meetings
- Young Professional Network – events and meetings

INLAND EMPIRE CHAPTER

- Retractable Banner
- Materials for Realtor visits and presentations

GREATER SACRAMENTO CHAPTER

- Sacramento Chapter Brochures
- Insert in SAR Magazine
- Retractable Banner

NORTH SAN DIEGO-TEMECULA VALLEY CHAPTER

- Replacement of the CREIA Chapter retractable banner
- Printed Chapter flyers and "How to Choose a Home Inspector" (downloaded from the CREIA Website) to distribute to local Realtor offices

PALM SPRINGS CHAPTER

- Chapter Promotional Materials to Realtors

SAN DIEGO CHAPTER

- San Diego Association of Realtors Expo

TRI-COUNTIES CHAPTER

- Participation in an Expo Trade Fair
- Flyers
- Signage

A NOTE TO THE CHAPTERS WHO WERE AWARDED:

Please refer to the information below for information about the fund reimbursement process.

Please note Chapter reimbursement request with accompanying documentation and receipts must be sent to CREIA at info@creia.org by June 30, 2017. Only the projects listed in your application will be reimbursed. Please be advised that we cannot grant any extensions for reimbursement; if your Chapter does not submit the reimbursement request on/before the deadline date you will not be eligible to receive the grant award. For those chapters who have already held events or carried out activity identified in your application, those checks will be issued.

Congratulations again, and thank you for continuing to positively impact the community and the profession. Your Chapter's commitment and efforts do not go unnoticed.

Please contact the CREIA Office at 949-715-1768 or info@creia.org with any questions, comments, ideas, etc.

Sincerely,
Steve Carroll, Chair
CREIA Public Relations & Marketing Committee

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Display advertising in the Inspector Journal shall comply with the criteria specified for display and classified advertising. CREIA is not responsible for any claims made in an advertisement. Advertisers may not, without prior consent, incorporate in a subsequent advertisement the fact that a product or service has been advertised in a CREIA publication. CREIA's acceptance of advertisements shall in no way imply a direct affiliation between CREIA and its advertisers. The appearance of advertising on any CREIA forum is neither a guarantee nor an endorsement by CREIA of the product, service, or company or the claims made for the product in such advertising. As a matter of policy, CREIA will sell advertising space to any advertiser when the content of the advertising does not interfere or directly conflict with the mission, policies, statements, objectives or interests of CREIA. CREIA, in its sole discretion, retains the right to decline any submitted advertisement or to discontinue posting of any advertisement previously accepted.

CIRCULATION

900+(Members, subscribers, schools, libraries, prospective members). Printed twice yearly.

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Display ads should be submitted as a high resolution (300 dpi or higher) TIF or JPG with fonts embedded in the file. Display ads must be exactly measured according to the listed ad sizes. To determine size correctly, measure ad from outside border to outside border. A compressed file can be sent to info@creia.org. Please call the CREIA office with any questions.

PAYMENT

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DEADLINE

The advertising deadline for the Spring edition is February 15. The advertising deadline for the Fall edition is September 15.

DISPLAY AD RATES – ALL LEVELS ARE SUBJECT TO AVAILABILITY.

CREIA Affiliates receive 25% off of all a la carte selections. CREIA Premier Affiliates receive 50% off of all a la carte selections.

Size	Width x height	Rate
Inside Front Cover*	8.75"x11.25"	\$950
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Half page horizontal with bleed*	8.75"x5.75"	\$380
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Half page vertical with bleed*	4.5"x11.25"	\$380
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Quarter page (no bleed)	3.75"x5"	\$250
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CREIA INSPECTOR Magazine

A PUBLICATION OF THE CALIFORNIA REAL ESTATE INSPECTION ASSOCIATION

ATTENTION MEMBERS:

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

CREIA Inspector Magazine is published semi-annually by the California Real Estate Inspectors Association (CREIA)

65 Enterprise
Aliso Viejo, CA 92656
Phone 949-715-1768
Fax 949-715-6931
www.creia.org

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2nd Wednesday of each month 6 p.m.
CK Grill and Bar, 14725 Harlan Rd, Lathrop, CA 95330

GOLDEN GATE CHAPTER

1st Tuesday of each month 7 p.m.
Buttercup Grill & Bar
660 Ygnacio Valley Rd., Walnut Creek, CA 95496

GREATER SACRAMENTO CHAPTER

3rd Wednesday of each month 6 p.m.
Sam's Hof Brau, 2500 Watt Ave., Sacramento, CA 95821

GREATER SAN GABRIEL VALLEY CHAPTER

2nd Tuesday of each month 5 p.m.
Zapata Vive, 101 S. 1st Ave., Arcadia, CA 91006

INLAND EMPIRE CHAPTER

3rd Wednesday of each month 7 p.m.
Carrows
11669 E. Foothill Blvd., Rancho Cucamonga, CA 91730

KERN COUNTY CHAPTER

3rd Tuesday of each month 6 p.m.
Casa Munoz Restaurant
Corner of E. 18th Street & Union Ave., Bakersfield, CA 93305

LA MID-VALLEY CHAPTER

1st Wednesday of each month 6 p.m.
Acapulco Restaurant
722 N. Pacific Avenue, Glendale, CA 91203

LA/VENTURA CHAPTER

1st Wednesday of each month 6 p.m.
Acapulco Restaurant
722 N. Pacific Avenue, Glendale, CA 91203

LA WEST/SOUTH BAY CHAPTER

3rd Wednesday of each month 5 p.m.
The Lakes Golf Course
400 S. Sepulveda Blvd., El Segundo, CA 90245

NORTH BAY CHAPTER

Last Wednesday of each month 5 p.m.
McIness Golf Center
350 Smith Ranch Road, San Rafael, CA 94903

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Last Wednesday of each month 5 p.m.
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ORANGE COUNTY CHAPTER

3rd Monday of each month 5:30 p.m.
The Hometown Buffet
1008 East 17th Street, Santa Ana, CA 92704

PALM SPRINGS CHAPTER

3rd Thursday of each month 6 p.m.
Coco's Diner, 78375 Varner Road, Palm Desert, CA 92211

SAN DIEGO CHAPTER

1st Tuesday of each month 5:15 p.m.
Filippi's Pizza, 9969 Mira Mesa Blvd., San Diego, CA 92126

SAN FRANCISCO PENINSULA CHAPTER

4th Tuesday of each month 5:45 p.m.
Mimi's Cafe, Bridgepoint Shopping Center
2208 Bridgepoint Pkwy., San Mateo, CA 94404

SAN JOAQUIN VALLEY CHAPTER

3rd Wednesday of each month 7 p.m.
Yosemite Falls Cafe, 5123 N. Blackstone Ave, Fresno, CA 93710

SAN LUIS OBISPO CHAPTER

3rd Tuesday of each month 6 p.m.
Margie's Diner, 1575 Calle Joaquin, San Luis Obispo, CA 93405

SHASTA/CASCADE CHAPTER

1st Tuesday of each month 5 p.m.
Sailing Board Restaurant
2772 Churn Creek Rd., Redding, CA 96002

SILICON VALLEY CHAPTER

2nd Wednesday of each month 5 p.m.
Blue Pheasant Restaurant
22100 Stevens Creek Blvd., Cupertino, CA 95014

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Grinder Deli Restaurant & Catering
1 W Los Angeles Ave (Moorpark Ave), Moorpark, CA 93021