

Newsletter of:

The
Electrical Contractors Association
Of Tidewater



E.C.A.T.

A non-profit Trade Organization

Founded in 1954

1016 Green St., Norfolk, VA 23513
Phone: 757-855-0011

Our Mission is to provide Electrical Contractors & Tradesmen of Hampton Roads with a heightened awareness of growth in the electrical industry.

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ECAT meets on the Third Thursday of every month, September thru April at the Aberdeen Barn, 5805 Northampton Blvd., Virginia Beach, VA. Happy Hour starts at 6:30p.m. with the meeting starting at 7:30p.m..

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Events

Fundraiser

Spring Event 2007 Picnic

To Be Announced

Winter Event – 2007

To Be Announced

Charitable

Summer Event 2007 – Golf,

To Be Announced
(American Cancer Society)

Fall Event – 2007

To Be Announced
(CHKD, Habitat for Humanity)

Editor's Message

2008 has been a tough year for many Americans and tradesmen. I hope 2009 grounds and stabilizes things enough to bring about a return in prosperity.

Through our meetings with one another, we have kept in touch, gave each other encouragement, shared our condolences for loved ones lost this year, sat down to share a great meal and forget about our problems for an evening of fellowship with each other; people that we have something in common with, offered to help where we could and kept on top of current events and trends in our businesses.

These are but a few of the reasons that I appreciate this organization. I wish our invitations reached out more to other contractors in such a way that they too could share in this comradery and appreciate the bond that we share. It really is a good feeling to get all the members in one room and enjoy our fellowship.

If you not a member of this wonderful organization, you should really consider it. And that statement is not a solicitation...just one long-term members view on the rewards of being associated with the fine people that make up the Electrical Contractors Association.

ECAT members and Sponsors now have new business exposure through our Web and Yellow Page listings. For more information contact us at ecatva1@aol.com or call 855-0011. Sign up before the 30th of each month to insure your company gets recognized as an ECAT member.

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ANNOUNCEMENTS

We are currently under the 2005 code.

ECAT members and Sponsors now have new business exposure through our Web and Yellow Page listings. Sign up now to insure your company gets recognized as an ECAT member.

TRADESMAN CONTINUING EDUCATION REQUIREMENTS

Effective with licenses that expire in 2008 and after, as a condition of renewal, all individuals holding a journeyman or master tradesman license will be required to complete a continuing education course in each discipline in which they hold a license. For example, an individual holding a master electrician license will be required to complete an approved electrical continuing education course. An individual holding a master electrician and master plumbing license will be required to complete an approved continuing education course in electrical and plumbing. For the trades of plumbing, electrical and HVAC the course must be three hours in length and for gas-fitting, natural gas and liquefied petroleum gas, one hour each. The continuing education must be completed prior to the expiration date on your license.

Currently, all Certified Elevator Mechanics must complete eight hours of continuing education, from courses approved by the Board for Contractors, as a prerequisite for renewal of their certification. Continuing education from NEIEP and CET level courses have been approved by the board, however, electronic reporting is still sporadic, requiring that you provide a copy of your training certificate along with your renewal card.

ALL continuing education courses must be approved by the Board for Contractors in order for them to be used as part of the renewal requirements. [Click here for a list of approved providers in PDF Format](#). This list is amended regularly as courses and providers are added and removed, therefore, you should check the list prior to scheduling your training class.

You should review the education requirements contained in the Boards regulations. Please do not hesitate to contact the licensing staff at (804) 367-8511 for any questions you may have regarding your license.

Note: The Electrical Contractors Association of Tidewater (ECAT) will be holding classes annually and throughout the year to meet this need. If you are interested, contact us ecatva1@aol.com or by calling 757-855-0011

The Hazards of Electricity – Do You Know What They Are?

The three main hazards of electricity are electric shock, electrical arc-flash, and electrical arc-blast. OSHA statistics show that several hundred deaths occur annually as a result of electric shock. This number has come way down since the introduction of GFCIs but is still a tragedy on an enormous scale. Studies also show that 10-15 employees are hospitalized every day with arc-flash burns. It is for these reasons that it is important that everyone understands the hazards of electricity.

Electric Shock

Electric shock occurs when a person's body completes the current path between two energized conductors of an electrical circuit or between an energized conductor and a grounded surface or object.

Electrical Arc-Flash

There seems to be a serious misconception in the industry that electrical arcs are a product of only high voltage. Actually, electrical arc-flash is not voltage sensitive but is more a product of short-circuit current and clearing time or arc duration. In some cases, it is possible to generate higher arc energy from a low-voltage source than from a high-voltage source. The amount of energy will in turn determine the temperature of the arc, which can reach 20,000°K (Kelvin) or about 35,540°F.

Electrical Arc-Blast

According to studies on the subject, the pressures from an arc are developed from two sources, the expansion of metal in boiling and vaporizing, and the heating of air by passage of the arc through it. Copper expands by a factor of 67,000 times when it vaporizes. This accounts for the expulsion of near-vaporized droplets of molten metal from an arc. These droplets can be propelled for distances of up to 10 feet (3 m). Plasma (ionized vapor) is also generated outward from the arc for a distance proportional to the arc power. One inch³ (16.39 cm³) of copper vaporizes into 1.44 yards³ (1.098 m³) of vapor. The air in the arc stream expands in warming up from its ambient temperature to that of the arc, or about 20,000 °K (35,540 °F). The arc-blast created by the heating of the air is similar in nature to the generation of thunder by the passage of lightning through it.


Go to the following link to read the full report presented at the 2006 IEEE IAS Electrical Safety Workshop, February 7-10, 2006, Philadelphia, Pennsylvania.

http://www.ewh.ieee.org/cmte/ias-esw/pdfs/Hazards_of_Electricity.pdf

DISCUSS VIOLATION PHOTOS with JOE TEDESCO

Joe is pretty good at finding interesting Pictures for discussion topics. Stop by and take a look. Some of these photos are hard to believe!

www.Electrical-Contractor.net/Forum




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WEB LINKS

Some History of Residential Wiring Practices in the U.S.

On December 31, 1879, Thomas Edison exhibited his newly invented electric lighting in a few houses along a residential neighborhood in Menlo Park, New Jersey. That New Year's Eve night proved to be not only historical in terms of its significance to American ingenuity and invention, but it also signified the beginnings of residential electrification in the United States. Although originally available to only the wealthiest of families, by the turn of the century electricity in the home was becoming a reality for more and more people. This paper traces the history of some residential wiring practices from the early days of electricity into the 21st century. Wire and cable systems, overcurrent protection, raceways and boxes, wire splices and terminations, wiring devices, grounding, polarity and special protection devices are presented from the historical perspective of time, necessity, and technology. The influence of Code requirements and common trade practices are also presented.

[Click here](#) to read the rest of this paper by David A. Dini P.E. – Underwriters Laboratories Inc.

CODE CORNER

11. What are the requirements for running air duct and or water pipe above indoor switchboards, panelboards, distribution boards, and motor control centers?

A. The footprint space (width and depth of the equipment) extending from the floor to a height of 6 ft above the equipment or to the structural ceiling, whichever is lower, must be dedicated for the electrical installation. No piping, duct, or other equipment foreign to the electrical installation can be installed in this dedicated footprint space [110.26(F)(1)(a)]. Figure 110-50

Foreign systems such as air ducts and water piping can be located above the dedicated space if protection is installed to prevent damage to the electrical equipment from condensation, leaks, or breaks in the foreign systems 110.26(F)(1)(b).

12. What are the grounding requirements for a satellite dish?

A. According to 810.20, each lead-in conductor from an outdoor antenna must be provided with a listed antenna discharge unit located nearest the point of entrance, but not near combustible material. The antenna discharge unit and the mast or metal structure that supports an antenna must be grounded to one of the following [810.21(F)(1)]:

Building or structure grounding electrode system [250.50].

Interior metal water piping system, within 5 ft from its point of entrance [250.52(A)(1)].

Accessible service bonding means [250.94].

Metallic service raceway.

Service equipment enclosure.

Grounding electrode conductor or the grounding electrode conductor metal enclosure.

If a ground rod is installed for the antenna, it must be bonded to the building's power grounding electrode system with a minimum 6 AWG conductor [810.21(J)] to reduce voltage differences that may develop between the building's power and the radio and television equipment grounding electrode system during lightning events. Figure 810-12

13. What is the smallest conductor required for a 9 kW, 240V single-phase electric space heater that contains a 3A blower motor if the terminals are rated for 75°C conductor sizing?

A. According to 424.3(B), the branch-circuit conductors and overcurrent protection device for electric space-heating equipment must be sized no less than 125 percent of the total load.

Step 1: Determine the heating load

$$I = VA/E$$

$$I = 9,000 \text{ VA}/240\text{V}$$

$$I = 37.5\text{A}$$

Step 2: Conductor size at 125% of the total heating load.

$$\text{Conductor Size} = (37.5\text{A} + 3\text{A}) \times 1.25$$

$$\text{Conductor Size} = 50.63\text{A, round up to } 51\text{A}$$

Conductor required would be 6 AWG, rated 65A at 75°C is required [Table 310.16].

14. I have a 25' metal light pole on which are

mounted speakers along with stage lighting. The pole is hollow and the lighting and audio circuits have been run together inside the pole. I am in the process of pulling these poles for rehab and need to know if I am required to separate the audio cables from the power conductors within the pole?

A. The output wiring for audio circuits must be in accordance with the marking for use with the specific class of wiring method. Typically audio equipment marking indicates that Class 2 wiring methods in accordance with 725.82 are permitted. According to the requirements of 725.55(A), Class 2 conductors and power conductors must not be placed in any enclosure or raceway with power conductors, unless the power conductors or Class 2 circuit conductors are contained in a Chapter 3 wiring method [725.55(J)]. So just be sure the power conductors are contained in a Chapter 3 wiring method such as UF cable, ENT, Flex, etc. and you're good to go.

15. What is the minimum step-back working space required for a 277/480V system, when there are exposed live parts on one side and grounded parts on the other side?

A. Well... if you do the measurement in inches, the minimum distance measured from the enclosure front must not be less 3 1/2 ft (42 inches). However, if you use a metric tape measuring device you need 1 meter, which by the way is about 39 inches [90.9(D) and Table 110.26(A)(1)].

Note: I don't make the rule's, I'm just the messenger...

16. What is the largest size transformer permitted to be mounted above a suspended ceiling used for environmental air?

A. Dry-type transformers, rated not more than 50 kVA, are permitted above suspended ceilings or in hollow spaces of buildings, if not permanently closed in by the structure [450.13(B)].

17. I am entering a building with a 600 pair underground telephone cable and I need to run this cable a few hundred feet above a suspended ceiling. Can I use EMT for this purpose?

A. No. Communications wires and cables installed within buildings must be listed in accordance with 800.113 and 800.179. However, unlisted communications cable (underground) is permitted if the length of the cable within the building from its point of entrance doesn't exceed 50 ft and the cable terminates in an enclosure [800.113 Ex. No. 2].

Note: The point of entrance is defined as the point where the cable emerges from an external wall, from a concrete floor slab, or from a rigid metal conduit or an intermediate metal conduit that is grounded (bonded) to an electrode in accordance with 800.100 [800.2]. This is why EMT can't be used.

18. I recently came across a handhole with a metal cover in the backyard of a house, that is used to splice the underground service conductors for the home. I told the utility mechanic that the cover needed to be grounded (bonded) since there could be accidental contact with live electrical circuits. He said (basically take a hike) that he did not have to ground the metal cover because utility companies comply with the National Electric Safety Code (NESC), not the National Electrical Code (NEC).

A. According to the NEC, metal covers and other exposed conductive surfaces of handholes must be effectively bonded to an effective ground-fault current path in accordance with 250.4(A)(5) that ensures electrical continuity and the capacity to conduct safely any fault current likely to be imposed on them [250.96(A)]. This is accomplished by bonding the metal parts to an equipment grounding (bonding) conductor that is sized to the circuit protection device in accordance with 250.122.

A ground rod cannot be used for this purpose because the earth contact resistance is so high, very little current would return to the electrical supply source via the earth. Plus, since the utility does not provide overcurrent protection for their secondary conductors, the fault would not be able to be cleared anyway. New Graphic.

Bottom line... don't ever touch anything metallic that contains utility wiring!

19. Electricians in our area ground the metal conduit that runs up a utility pole to a local ground rod. Is this a Code compliant installation?

A. The NEC requires all metal raceways that contain service conductors to be grounded [250.80], but grounding a metal raceway to a ground rod serves no purpose in removing or reducing dangerous voltage on metal parts from a ground fault.

What is required is that all metal raceways and enclosures containing service conductors be bonded to an effective ground-fault current path in accordance with 250.4(A)(5). This can be accomplished by the installation of an equipment bonding jumper, of any length, from the top of the metal pipe to the utility secondary neutral terminal in accordance with 250.102(E).

20. When can I mix the control wiring for air-conditioning equipment with the equipment's power conductors in the same raceway?

A. If the remote control circuit conductors are classified as Class 1 and they are installed in accordance with 600V insulation [725.27(B)], then they can be in the same raceway with the A/C equipment power conductors [725.26(B)(1)]. But, control wiring for most A/C equipment is classified as Class 2, not Class 1 because it is supplied by a Class 2 power supply.

The NEC permits Class 2 circuits to be reclassified as Class 1, if the Class 2 equipment markings on the power supply are removed, but all of the circuit conductors in the raceway must have 600V insulation and they must be within a Chapter 3 wiring method [725.25 and 725.27(B)].

Note: Class 2 circuits reclassified as Class 1, are no longer Class 2, regardless of the continued connection to a Class 2 power source and they are not permitted to be installed with other Class 2 or Class 3 circuits that have not been reclassified as Class 1 [725.55].

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ECAT



YOU ARE CORDIALLY INVITED!

Since 1954, ECAT has worked to unify residential and light commercial contractors, licensed tradesmen and associated support businesses in the Hampton Roads area. This is accomplished through fellowship, trade & area related topics of interest, continuing education, activities and the strength of organizing independent business owners and tradesmen who may share common goals and interests.

Membership in ECAT includes:

- 7 dinner meetings per year (September – April) with Happy Hour, guest speakers and vendor display's
- Association with other Tradesmen, Inspectors, suppliers and trade supporting businesses
- Newsletter on our industry
- Public advertising for your business with Yellow Page exposure
- Job Referrals

ECAT is also involved in raising money for many charitable organizations including the American Cancer Society, Children's Hospital of the King's Daughters and Habitat for Humanity.

Join us at the next ECAT meeting, any 3rd Thursday of the month. The meetings are held at The Aberdeen Barn, 5805 Northampton Blvd., and begin with a happy hour at 6:30 p.m. followed by dinner with a guest speaker from 7:30 – 9:30 p.m. First time sponsored guests are free. Non-sponsored guest fee is \$45. This is a wonderful way to gain exposure for your business, expand your contacts and meet new people. I can personally guarantee that it will be among the most rewarding membership dollars you will spend.

Please call me at 855-0011 if you are able to join me. For more information on ECAT visit our web site at www.ecatva.com.

Business

GETTING YOUR PHONE TO RING, PART 4 - WRAPPING IT UP

Michael Stone of Construction Programs & Results (www.markupandprofit.com) is a popular speaker, business coach and consultant dedicated to helping construction-related contractors survive and thrive. He is the author of "Markup & Profit; A Contractor's Guide" and his newest book, "Profitable Sales, A Contractor's Guide", and can be reached by email michael@markupandprofit.com by phone (1-888-944-0044), or visit his website (www.markupandprofit.com).

We have been reprinting from his newsletter his latest series on "Getting Your Phone to Ring".

If you missed any of the previous parts click on the following links to access them now:

[Getting Your Phone to Ring, Part 1](#)

[Getting Your Phone to Ring, Part 2](#)

[Getting Your Phone to Ring, Part 3](#)

From the feedback we are getting, we know that some of you are trying or have tried our suggestions, and they are working.

Remember as you develop new ad campaigns or adjust your web page you must always address your customer's three fears. Your customers ask themselves the same three questions you do.

- 1) Will this company do what I want them to do?
- 2) Will they do my job in a timely manner?
- 3) Will they do my job at a fair price?

If you don't answer those questions in your advertising, they simply won't call. If you will go back and look at some of the web sites I posted in our last newsletter, you will find that most of them address those issues, some on each page. We addressed this in our first newsletter on this series.

Today we're going to wrap this series up. One of our coaching clients recently reminded me of an idea I gave him several years ago.

Unfortunately, anytime we have a market adjustment construction related companies go out of business. Watch other companies and when you hear about a larger or well-known company that fails, offer to buy their phone numbers. The numbers are not worth thousands or your firstborn. They are maybe worth \$50 to \$500, depending on how well known the company is and how badly you want the number. You may have to negotiate with the phone company as well.

The upside is that **you are** getting calls in for the company. That includes leads for potential sales. The downside is that you get the negative calls from bill collectors, irate home or building owners, people

with warranty issues. Hey, for the business that can come, take it on. You can defray the creditors by telling them that you have nothing to do with the old company and give them a number to call.

If it is warranty work, explain you will be glad to come out and look at the problem and help them get it fixed. Also tell them that you are not responsible for the problem and that you must charge for that service. There is the potential of generating goodwill by helping folks, and you can always ask if they have other work that needs to be done while you're there. Be sure that you tell the folks that you are not responsible for the other company's work or warranties and make double sure you have language that addresses that in your contracts.

Once you get in front of folks, treat them right and the business is yours. This could be a tremendous opportunity to pick up new business.

Be smart. Don't cut your prices to get the work. The customer has already seen what dealing with a contractor who cut his/her prices will get them. Focus on doing a good job, on time, and helping them get back to living their lives the way they want. Charge a fair price and do what you agree to do.

Change of subject. There is an unusual program from the US Department of Agriculture that some of our clients have been involved with, and they tell me it works great. It is called Section 504 Loan and Grant Programs.

The Section 504 Loan and Grant Program allows elderly people with very low incomes to maintain their independence by allowing them to remain in their own homes. The loan program is available to any rural person with a very low income, but most

program beneficiaries are elderly. The 504 Loan Program helps qualifying applicants repair, improve, and/or modernize a home, make it safe and sanitary, or remove health and safety hazards.

The 504 Grant Program is available exclusively to very low-income rural seniors aged 62 or older. The program provides funds to make such major repairs or renovations as removing electrical and fire hazards, replacing roofing, installing or improving water and wastewater disposal systems, and installing insulation and heating and cooling systems. If you are smart, you will partner with a local remodeling company so that you get in on all the jobs being done, not just those that are exclusively electrical work.

While this program may not fit those that work in the big cities, it will work for many of our readers. Regardless of where you live or your work area, check it out. One of our coaching clients told me that the person in charge of the local USDA office told him they have more money than they have applications. No one seems to know about the program.

Here is the link: <http://www.rurdev.usda.gov/rd/pubs/pa1662.htm>

As long as we are talking about government programs, here is another site you should take a look at. <http://www.hud.gov> This is the U.S. Department of Housing and Urban Development. They have a number of programs that might help your customers if you connect the two. Other links to get you started are:
<http://www.hud.gov/improvements/>
<http://www.hud.gov/buying/localbuying.cfm>
<http://www.hud.gov/offices/cpd/affordablehousing/programs/home/addi/>

To wrap up our series, "Getting Your Phone to Ring", we interviewed Gordon Clotworthy, CEO and President of The Information Refinery in Mahwah, NJ. The Information Refinery (www.ConstructionLists.com) has been in the direct marketing business for over 23 years, and is the #1 source in the world for construction-related marketing lists.

CPR - It's great to talk with someone who understands direct marketing and construction. Can you give us the rundown on direct marketing options for contractors?

Gordon - There are 4 basic approaches to direct marketing - postal (or snail mail), email, telemarketing and faxing.

Direct mail is by far the best method of direct marketing. It's affordable and, with a well-designed mail piece and a well-defined list, it can prove to be the most economical and effective method for both immediate sales and future sales.

CPR - Where do you get your lists from?

Gordon - We manage over 100 construction related response lists which for all intents and purposes cover the entire marketplace. We also have strategic partnerships that provide us direct access to all of the consumer and general business-to-business lists and data bases available. Due to the high volume we purchase on a daily basis, we are able to obtain lists at the lowest possible price and pass the savings on to our customers and clients. We also have the ability to merge various lists together and append data in order to build a list that meets the best meets the target audience.

CPR - How many ways can you define a mailing list?

Gordon - There is a great deal of information that can be selected to develop the best possible mailing list. For example, you can select homeowners based on their income range, age of their home, time they've lived in the home, whether or not they have children, the ages of their children, the value of the home, single parent or married, handicapped . . . the options go on and on.

For example, if you specialize in bathroom remodels, you may want a list of homeowners within a certain area with an income over \$100k living in a home that's over 20 years old. If you build new homes, we can provide a mailing list of apartment dwellers, with 2 or more kids and with whatever income level that suits your project.

CPR - How expensive is a mailing list?

Gordon - You can get a decent consumer list, sliced and diced to meet your target market, for about \$65-\$70 per 1,000 names, minimum of 3,000 names. For a few dollars more you can use the names over and over - in a year, for a very nominal fee, we will clean and refresh it for you. For \$10 more per thousand, we'll include phone numbers in case you want to follow up on your mailings with a telemarketing program.

Ask your mail list provider how deliverable the list you plan on purchasing is - will they guarantee deliverability? When was the last time the list was "cleaned" by the post office? (On average, one third of all businesses and consumers move or make a

change to their address each year.) If a mailing list isn't kept current you'll end up wasting up to 1/3 of the total cost of your mailing and more importantly your response rate drops through the floor. We guarantee our lists to be at least 93 percent deliverable - some lists are guaranteed 100 percent deliverable.

CPR - What about commercial names?

Gordon - We have a database of over 13 million businesses. If you want to know owners of strip malls in your city, we can provide it. Facility managers, property managers, owners, we have it. Decide what kind of commercial construction you want to do and we'll match it to the prospects most interested in what you have to offer. Think out of the box. If you can pick up work from strip mall owners there will always be work to do. If you are a painting contractor and gain the business of a few good sized apartment complexes you know that the end of the month and the beginning of the month will be booked solid.

One of the great things about direct marketing is that when you start the process, you begin to expand your thinking and realize other ways to tie your ongoing search for new business together. You develop plans. And plans always work better than just throwing precious money here and there because "it sounded like it would work".

CPR - What makes your business different from others?

Gordon - I come from the same background as Michael - building my business from the ground up. In my case I've had my share of trying to meet payrolls and working 16 hour days 7 days a week. Those experiences helped me develop our corporate philosophy.

We actually consult with our prospects and clients. We let them know all of their options and guide them into making the right decisions. If someone wants to do something that we think might be a mistake, we let them know. We're the furthest thing from "yes" people you'll find. Our goal is to serve our clients best needs. Not to sit back and let a customer buy the wrong list just so we can make a sale. It's what separates us from our competitors.

Every client matters to us, that's simply the way we like to do business.

CPR - What about the other avenues of direct marketing?

Gordon - Everyone thinks email is the greatest thing

since sliced pizza, but it's not a great marketing approach. It can be dangerous - if you do it yourself and get complaints, there is the risk you'll have your website shut down. If someone offers to sell you email addresses, those are spam addresses. You can't buy or sell an email address, because they are owned by the person who holds them.

Currently we are discouraging our clients who wish to do email marketing. It's just not effective anymore and although everyone is under the misconception that it doesn't cost nearly as much as a postal campaign they are dead wrong. Here's why, the vast majority of the emails sent aren't read because they end up directly in a spam folder. Because of viruses and scams people just don't want to risk opening emails from someone or some company they do not know. When you sit down and actually calculate the costs and the sales derived, you'll find that your cost per sale compared to a postal campaign are off the chart.

However, if someone is hell bent on doing it we'll grudgingly oblige. We take their message and do the email broadcast for them. Our email lists are from those who've agreed to receive advertising, and we follow all the laws. But, as I said before, it's not effective and you won't be happy with the results.

CPR - Do any contractors actually do telemarketing?

Gordon - Yes, usually large companies who've been in business for a long time. They realize the need to use all avenues available. Companies will buy a list of people in a neighborhood around a job they are working or a list in their service area and put their telemarketers to work. Our lists are cleaned through the "Do Not Call" database so they comply to the laws, but the telemarketers still have to follow federal guidelines.

CPR - What about faxing?

Gordon - Don't do it. Unless you have prior agreement from the party you are faxing you are breaking the law. You can get a \$500 fine for each fax complaint. There are lawyers who advertise hoping to reach people and companies who've received junk faxes so they can go after the company involved.

CPR - How about lead suppliers, companies that promise to send you qualified leads?

Gordon - I'm not impressed with them. If you want to know more about them, we have a number of those businesses listed on our website www.AECSalesLeads.com.

Unless you are getting a 1 on 1 lead - a lead that is given to you or at most 2 others - it just doesn't make sense. If the lead provider is selling it to a slew of other contractors in the area, by the time you call that lead, they are sick of hearing from contractors. You might be the 20th contractor who's called them that day and you can be sure they don't want to talk to you. But you still have to pay for the lead.

That being said, I see a glimmer of hope on the horizon. A new site has just started and they will be working on the premise of providing leads on an exclusive basis. And get this, the leads are free. It's based on a reciprocal concept. The site is in beta format but you can find details here:
www.LeadPatch.com

If you spend the money you'd spend on a lead supplier on direct mail instead, you'll get better leads. Your potential customers will know who you are when you call. You aren't just another contractor; you're that guy on the postcard who builds beautiful jobs.

When a lead comes in, be sure to ask how they heard about you. Keycode your direct mail pieces so

you know which are effective and which aren't. You want people to hear your name from a number of sources. And remember to use testimonials. When you can say, "We do great work - but don't ask us, listen to what Susie said", you'll go much farther.

The bottom line is that there are a lot of avenues for advertising, and the successful company does a mix of all of them.

This concludes our four-week series on "Getting Your Phone to Ring". Now it is up to you. If you take some or all of these ideas, get out into the market place and get after that business, you will do well. They've worked for others and could work for you.

Keep us posted on how you are doing and if you find something new that works, let us know. We will post it in an upcoming newsletter and all of your fellow readers can share.

To all of you who have helped out by sharing your ideas, thank you for joining us and "We like to see the good guys win!"

Training

Air Conditioning and Refrigeration Equipment

By Mike Holt – a short summary of the requirements contained in the [Understanding the 2008 NEC, Volume 1 Textbook](#).

Keep your cool when working with hermetic motors.

Article 430, the largest Article in the NEC, is commonly understood to be "the motor Article." But if motors are a part of air-conditioning and refrigeration equipment, they also fall under Article 440. For these motors, the rules in Article 440 amend the rules in Article 430 and other Articles [440.3(A)].

Article 440 exists because of the difference in cooling characteristics between hermetic motors and those that aren't hermetic. Its primary goal is to keep hermetic motors within a tighter than normal temperature band by limiting excess current.

We began with some background on hermetic motors so you can understand why they have special requirements in the NEC. Now you understand how to apply those requirements.

The motors in air-conditioning and refrigeration equipment are not your ordinary motors. They are "hermetic" motors. The word "hermetic" means "sealed," as in air tight. This refers to the environment in which the motors are installed. Hermetic motor windings are actually in the refrigerant, inside a sealed casing.

Because of their location in the equipment and because of design factors unique to motors used in such equipment, the cooling characteristics of hermetic motors differ from those of non-hermetic motors. The basic difference is hermetic motors heat up faster.

Non-hermetic motors are typically built to industry standard specifications, and buyers select from standard offerings. The typical non-hermetic motor

can satisfy a wide range of purposes and work in a wide range of equipment.

Hermetic motors are built to an equipment manufacturer's precise standards, and are custom-made for specific equipment.

For example, Trane wants 90-frame hermetic motors for compressor model X. So, Trane contracts with a motor manufacturer to produce X number of 90-frame motors built to work with that compressor. The custom specifications for that work even state which varnish will be used and how much must remain on the windings after dipping (that's how the varnish is applied) and baking. Carrier may contract that same factory to build its 90-frame motors to a different set of specifications (even using a different varnish).

Why the custom motors? A manufacturer of, say, air conditioning systems, develops a new 30 ton model to satisfy a particular market. The system must meet certain performance objectives, and is designed accordingly. To support the resulting design, the motor that drives the compressor must meet specific design requirements and constraints. Consequently, the manufacturer develops preliminary specifications.

The manufacturer then talks with hermetic motor suppliers. Operations people and engineers look at manufacturability vs. tolerances, production capacity vs. anticipated orders, and other factors. A hermetic supplier may offer a price based on the preliminary specifications, offer a price based on modifications to those specifications, or make suggestions the manufacturer will "take back to the drawing table."

Once the specifications are finalized, it's a matter of running a few calculations to come up with the nameplate data required by Articles 430 and 440.

You won't find hermetic motors in all equipment that's classified as air-conditioning and refrigeration equipment. Heaters, for example, fall under that classification but don't have hermetic motors (the exception being heat pumps, which do). See Articles 422 and 424, as appropriate.

Ampacity and rating

Use the rated-load current marked on the nameplate of the equipment to determine the rating of the:

- Disconnecting means.
- Branch-circuit conductors.
- Controller.

- Branch-circuit short-circuit and ground-fault protection [440.6(A)].

Exception: If the nameplate provides the branch-circuit selection current, use that instead of the rated-load current.

Disconnecting means

Locate the disconnecting means within sight from, and readily accessible from, the air-conditioning equipment [440.14]. "Within sight" means visible and not more than 50 ft from the equipment [Article 100].

You can mount the disconnecting means on or within the air-conditioning equipment, but you can't locate it in access panels or where it will obscure the equipment nameplate.

Two exceptions to this rule exist. One is that an accessible attachment plug and receptacle can serve as the disconnecting means. The other is that you don't need to place a disconnecting means within sight from the equipment, if you meet all of the following conditions:

- The disconnecting means is capable of being individually locked in the open position.
- The equipment is essential to an industrial process in a facility that has written safety procedures.
- The conditions of maintenance and supervision ensure only qualified persons service the equipment.
- The provision for locking (or adding a lock to) the disconnecting means is on the switch or circuit breaker and remains in place whether or not the lock is installed.

The receptacle for the attachment plug doesn't have to be readily accessible.

Overcurrent protection

You must provide protection against short circuits and ground faults. This protection must protect the branch-circuit conductors, control apparatus, and circuits supplying hermetic refrigerant motor-compressors.

You calculate the protection based on either a single motor-compressor configuration or a multi-motor configuration [440.22]. If the equipment nameplate specifies "Maximum Fuse Size," that size must not be exceeded and a one-time or dual-element fuse must be used.

Single Motor-Compressors. Size the short-circuit and ground-fault protection device at no more than 175 percent of the motor-compressor current rating [440.22(A)]. Compare this to the requirements for non-hermetic motors in Table 430.52, and you'll see Article 440 is trying to keep hermetic motors within a tighter temperature range.

If the protection device sized at 175 percent isn't capable of carrying the starting current of the motor-compressor, you can use the next size larger protection device. In no case can the protection device exceed 225 percent of the motor-compressor current rating.

Let's try out the calculations. Question: What size conductor and short-circuit and ground-fault protection device are required for a 24A motor-compressor connected to a 240V circuit?

- (a) 10 AWG, 40A (b) 10 AWG, 60A
(c) a or b (d) 10 AWG, 90A

Answer: (a) 10 AWG, 40A

Step 1: Determine the branch-circuit conductor [Table 310.16 and 440.32]:

$24A \times 1.25 = 30A$, 10 AWG, rated 30A at 60°C [110.14(C)(a)(a)]

[Table 310.16]

Step 2: Determine the protection device [240.6(A) and 440.22(A)]:

$24A \times 1.75 = 42A$, next size down = 40A

If the 40A short-circuit and ground-fault protection device isn't capable of carrying the starting current, you can size the protection device up to 225 percent of the equipment load current rating. $24A \times 2.25 = 54A$, next size down 50A.

Multi-motor compressors. What if the equipment incorporates more than one hermetic refrigerant motor-compressor? Or what if it has a hermetic refrigerant motor-compressor and other loads? Perform multi-motor calculations.

The rating of the branch-circuit short-circuit and ground-fault protection device must not be more

than the largest motor-compressor short-circuit ground-fault protection device, plus the sum of the rated-load currents of the other compressors 440.22(B)(1)].

Size the *branch-circuit* conductors at 125 percent of the larger motor-compressor current, plus the sum of the rated-load currents of the other compressors [440.33]. Conductor sizing

As with branch-circuit protection sizing calculations, base your conductor sizing calculations on either a single motor-compressor configuration or a multi-motor configuration.

Single Motor-Compressors. Branch-circuit conductors must have an ampacity not less than 125 percent of the motor-compressor rated-load current or the branch-circuit selection current, whichever is greater [440.32].

For these same conductors, size the short-circuit and ground-fault protection between 175 percent and 225 percent of the rated-load current [440.22(A)].

Let's work another problem. Question: What size conductor and short-circuit and ground-fault protection device are required for an 18A motor compressor?

- (a) 12 AWG, 30A (b) 10 AWG, 50A
(c) a or b (d) 10 AWG, 60A

Answer: (a) 12 AWG, 30A

Step 1: Determine the branch-circuit conductor [Table 310.16 and 440.32]:

$18A \times 1.25 = 22.50A$, 12 AWG, rated 25A at 75°C [Table 310.16]

Step 2: Determine the branch-circuit protection [240.6(A) and 440.22(A)]:

$18A \times 1.75 = 31.50A$, next size down = 30A

If the 30A short-circuit and ground-fault protection device isn't capable of carrying the starting current, you can size the protection device up to 225 percent of the equipment load current rating. $18A \times 2.25 = 40.50A$, next size down 40A.

A 30A or 40A overcurrent device can protect a 12 AWG conductor against ground-faults and short circuits for an air-conditioning circuit. See 240.4(G) for details.

HEALTH

DEFYING LOGIC

With all of the documented facts about how incredibly bad smoking is for your health, it baffles me that people continue to do it. Sure, the incidence of smoking is down substantially compared with 1964 -- but 47 million Americans continue to smoke.

For those of us who have a loved one who smokes, watching him/her light up day after day is frustrating and frightening. As much as you might want to shake him and throw out his cigarettes, pipes or cigars, taking a head-on approach is guaranteed to fail. To find out what does work, I spoke with smoking cessation expert Deborah Hudson, a registered respiratory therapist and program manager of Clarian Tobacco Control Center, which offers a gamut of tobacco-related tools, including prevention and cessation techniques.

STEP ONE: THROUGH THE SMOKER'S EYES

Hudson points out that helping a loved one through the painful process of giving up tobacco requires great patience and understanding. First, look at why a tobacco addict clings so tightly to what he knows is a lethal habit. Simply put, smoking can be a source of great pleasure. Hudson explains that tobacco smoke chemically alters the body in many ways, but along with the terrible things it does, it changes six neurotransmitters in the brain to actually increase pleasure, enhance memory, reduce anxiety and tension, modulate mood and suppress appetite. Add to this that for a smoker, having cigarettes at hand is akin to having a best friend to soothe you when you need it, to entertain you when you're bored and to give you extra time to ponder your response to a challenging person or situation. So it is really no wonder that smokers love it.

And the sobering realization that faces smokers grappling with their addiction is that giving up this extraordinarily satisfying habit can be and usually is excruciating -- more difficult, in fact, than getting off cocaine or heroin, says Hudson. No, it's not a pretty picture. But then again, neither are the cancers, cardiovascular diseases and numerous other physical consequences of continuing to smoke.

Trying to shame or criticize a smoker or "force" him to give up the habit with rational explanations is the worst possible approach, says Hudson. Smokers view these kinds of maneuvers as attempts to wrestle control from them, and they respond by going on the defensive. In fact, Hudson likens them to teenagers when it comes to their attitudes toward smoking. Tell a smoker he "has" to quit and he'll end up puffing away more just to prove that he, not you, controls his life. And don't bother playing the how-inconsiderate-it-is-for-others card. Years of smoking dull a smoker's sense of smell and create greater tolerance for smoke-filled rooms, says Hudson. A smoker simply doesn't experience the unpleasantness of tobacco smoke to the extent that a nonsmoker does, and he is apt to wonder what all the fuss is about.

STEP TWO: STRIKE WHEN HE'S READY

At some point, though, most smokers try to quit or decide they are ready to do so. Only when that happens, says Hudson, is it possible for you to be genuinely helpful. As you prepare to take action, keep an empathetic and nonjudgmental attitude. View a smoker as separate from the habit -- he is a person who is suffering from an addiction and what Hudson considers a chronic disease.

Once you know that a smoker is ready to quit, you can help in the following ways...

- * Share your concern about the dangers of the habit.
- * Let the person know you are there to help him lick this.
- * Ask permission to do so.
- * Don't tell the person what to do -- ask for suggestions about what you can do to help.
- * Ask if you can assist in finding him a program or other tools that ease the process.
- * If you are a former smoker, talk about what it was like for you to give it up.
- * Never nag.

STEP THREE: SHARE THE EXPERIENCE

Have no illusions. However cheerful and pleasant a person is ordinarily, being in the throes of giving up smoking obliterates these traits. Expect the person to be outrageously cranky and suffer from a variety of physical and psychological symptoms, including headaches, nasal and chest congestion, inability to concentrate, nausea, constipation or diarrhea, forgetfulness, restlessness, anxiety, depression and aggressive behavior. While these symptoms will start to ease after three or so days, it is just the beginning of a long process.

Here are some ways that you can be a source of support as your ex-smoker endures the withdrawal period...

- * Provide plenty of fruits and vegetables -- fiber will help ease the gastrointestinal symptoms and healthful nutrients will make it easier to avoid fattening foods.
- * Offer to exercise with the ex-smoker. Physical activity enhances moods, increases focus and is relaxing -- all properties that nicotine was providing.
- * Help the former smoker find new ways to de-stress. Deep breathing, a few minutes of meditation, going to the movies or for a quiet stroll can help fill the spaces that smoking once did.
- * Remind the person that your support is unswerving and show it with regular calls. Just be sure you don't come across as checking up.
- * Help the person avoid the situations that trigger his smoking -- being at a favorite coffee shop, socializing at a party, etc.

This will be a long and challenging process. The smoker may miss his cigarettes forever (as do my loved ones who have quit), but the benefits gained are well worth it in the end.

REFLECTIONS

Here's to the crazy ones, the misfits, the rebels, the trouble makers, the round pegs in the square holes. The ones who see things differently.

They are not fond of rules, and they no respect for the status quos. You can quote them, disagree with them, glorify or vilify them. About the only you can't do is ignore them. Because they change things, they push the human race forward.

And why some may see them as the crazy ones, we see genius. Because the people who are crazy enough to think that they can change the world, are the ones who do.

ON THE LIGHTER SIDE

"Do you believe in life after death?" the boss asked one of his employees. "Yes sir," the new employee replied. "Well, then, that makes everything just fine." The boss went on, "because after you left early to go to your grandmother's funeral yesterday, she stopped by to see you!"

CLOSING

If you are interested in becoming an ECAT member or receiving our monthly newsletter, visit our web site at www.ecatva.com, "memberships" link or, contact me at the address below.

If you have any concerns, complaints, ideas or interests about any future meetings, or you would like to contribute any publications or articles of interest to our newsletter, please contact us at ecatva1@aol.com. List your name, company name, address, phone number; fax number and/or e-mail address. Your input would be greatly welcomed.

We look forward to seeing you all at the meetings.

D.S. Jernigan

Historian,
E.C.A.T.

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