

# THE ELECTRIC TIMES

SERVING THE ELECTRICAL INDUSTRY IN ARIZONA

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AUGUST 2017

## ASU earns multiple awards for solar energy research

Jayne Cook  
Electric Times

The Sun Devils are beaming with pride this month as Arizona State University (ASU) has earned six distinguished awards for solar power advancement from the U.S. Department of Energy (DOE). The SunShot Awards, part DOE's SunShot initiative which aims to make solar more affordable and prominent in the U.S., are granted to universities, laboratories, state and local governments, private companies, and nonprofit organizations throughout the country working on promising research and development to advance the initiative's goals. ASU received awards totaling \$4.3 million, ranking it first among 2017 recipients in the Photovoltaics Research category.

The DOE launched the SunShot Initiative 2011 intending to make solar cost-competitive with other conventional energy sources by the year 2020. Now having reached a cost of \$0.06 per kilowatt-hour, which is 90 percent of its goal, the initiative has upped its target to \$0.03 per kilowatt-hour by 2030.

ASU Tempe's Quantum Energy and Sus-

tainable Technologies (QESST) NSF-DOE research center and testbed has established ASU's engineering program as a formidable force in the field of photovoltaics. The largest solar research facility in the country, QESST attracts researchers from around the globe to the Valley of the Sun to pursue the advancement of photovoltaic technologies, and with the SunShot Initiative now aiming even higher in achieving affordable solar, QESST will continue to play a major role in the photovoltaics industry.

"ASU receiving six DOE SunShot Initiative grants—many more than any academic institution on the awardee list—is a testimony to our faculty's excellence in building innovative solutions that help power the future in a reliable and cost-effective way," said ASU Executive Vice-President of Knowledge Enterprise Development and Chief Research and Innovation Officer Sethuraman "Panch" Panchanathan.

This year's award recipients include: Mariana Bertoni, assistant professor in the School of Electrical, Computer and Energy Engineering; Owen Hildreth, assistant pro-



Photo courtesy Jessica Hochreiter/ASU

ASU Tempe's Quantum Energy and Sustainable Technologies (QESST) research center and testbed is the largest solar research facility in the U.S.

fessor in the School for Engineering of Matter, Transport and Energy; Stuart Bowden, associate research professor in the School of Electrical, Computer and Energy Engineer-

ing; Govindasamy Tamizhmani, associate research professor at the Polytechnic School; and Meng Tao, professor in the School of Electrical, Computer and Energy Engineer-  
See 'ASU solar' page 3

## Desert View Systems looking to expand in the state

Jayne Cook  
Electric Times

It's not often that a contractor gets to build up and own his own company twice, but that's what happened with David (Mike) Scott, owner and president of Desert View Systems. What he and his wife, Debra started as their business together in 1996 as Desert View Electric, is now Desert View Systems, located at 3152 N. Lear Avenue, Suite 1, in Casa Grande. The company specializes in commercial, industrial, and agricultural projects that cover the entire state of Arizona, and boasts a low voltage group as well as design build capabilities.

Desert View's sizable client base and sterling reputation caught the interest of Interstates Construction, which in 2008,

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The Desert View Systems company team and their families.

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# News Briefs

## Kriz-Davis Co. to join Border States Electric

Fargo, N.D. – Border States Electric (BSE) has reached an agreement to acquire Kriz-Davis Co., an electrical distributor headquartered in Grand Island, Neb. Both companies are 100 percent employee-owned through Employee Stock Ownership Plans (ESOPs). Kriz-Davis Co. and its wholly owned subsidiary, Chapman Metering, will join the Border States family on Aug. 28, pending regulatory approval.

"Kriz-Davis Co. is a company we have admired for decades. They are a great cultural, geographic and market fit," said Tammy Miller, CEO at Border States. "We are both 100 percent employee-owned American companies serving the construction, industrial and utility markets. We are wired the same way. As owners, we are wired to deliver solutions, value and a customer-first mindset."

"Over the years, we have come to know and respect Border States and their leadership. Our two companies share the same values based on doing what's right for our customers, employee-owners, vendors and communities. Border States also maintains a strong belief in the power of employee-ownership," said Tim Berry, CEO at Kriz-Davis Co. "By joining with Border States, it only adds to the opportunities for customers, vendors and our employee-owners."

Kriz-Davis Co. has been in business for more than 70 years. With nearly 250 employee-owners, they generate \$200 million in annual sales through 19 locations (including Chapman Metering) in Nebraska, Iowa, Kansas, Oklahoma, Texas and Missouri.

## Legrand announces two promotions

Middletown, Pa. – In July Legrand announced two promotions to boost its sales and product teams. Tom Oliver and Jason Evans were named director, AV & security sales, eastern U.S. and product manager, audio products, Nuvo & On-Q lines, respectively.

In his new role, Oliver will work closely with AV reps, distribution partners and dealers to facilitate sales of On-Q and Nuvo products. Evans will oversee the development and support of new audio products in the On-Q and Nuvo product lines.

Oliver has more than 25 years of industry experience, most recently serving as Midwest market manager and Midwest channel manager in his five-year tenure at Legrand. Previously, he held various titles at several organizations, including Clare Controls, Sound & Vision, Crestron, Home Theater Authority, Best Buy and Circuit City.

Evans has more than 15 years of experience in custom installation, previously holding a national trainer position at Legrand. Before that, he was an install operations manager at ADT, the owner and CEO of Components Electronic Systems in Mesa, Ariz., and an operations manager at Automated Environments in Mesa.

## NEMA Isolated Ground Wiring Devices guide

Rosslyn, Va. – On July 18 the National Electrical Manufacturers Association (NEMA) published NEMA WD-AG 1-2017 Application Guide for Isolated Ground Wiring Devices to include new requirements under the 2017 National Electrical Code (NEC). This revision also covers wiring devices and accessories intended to help protect sensitive equipment from malfunction due to electrical noise on the equipment grounding path.

According to David Lutz, chairman of the Wiring Devices Technical Committee, "Isolated ground devices have been around for many years, but their use and installation continue to be misunderstood. This guide is a resource for the correct and safe use and installation of these devices, and has been updated to reflect the current NEC requirements."

NEMA WD-AG 1 also covers applications, troubleshooting, and maintenance of isolated ground circuits. Canadian requirements were removed from the current edition and will be addressed separately in a Canadian document.

## Code Corner: Article 590 Temporary Installations

Mark Cook  
ELA Education Electrical Instructor



Article 590 covers the provisions of temporary electrical power and lighting used in construction, remodeling, decorative holiday lighting, and for emergencies, and testing, or exper-

imental and developmental work.

### 590.2(B)

Temporary wiring methods found in Chapter 3 of the NEC, are subject to approval by the authority having jurisdiction based on the conditions of the installation.

### 590.3 (A) and (B)

There are time restraints for decorative seasonal and holiday lighting of 90 days but no time limits for construction sites except the duration of the construction process.

### 590.3(D)

This section requires all temporary wiring to be removed upon completion of construction.

### 590.4

The 2017 allows type SE cable to be installed in underground conduit for temporary installations only.

Type MN cable (Romex) shall be permitted as a method of temporary lighting and power and may have open splices provided that the Equipment Grounding Conductor or continuity is maintained with or without a box. Receptacle circuits on construction sites shall not be installed on any branch circuit that provides temporary lighting. New to the 2017 NEC is a requirement that all 15 and 20 ampere 125 and 250 volt receptacles installed in wet locations be listed as WR (Weather Resistant) as per 406.9(B)(1). All lamps shall be protected from accidental contact or breakage. Lamps with the glass envelope broken present an electrical shock hazard due to the fact that lighting is not required to be GFCI protected.

### 590.5

This requires all decorative lighting used for holiday and similar lighting purposes to

be listed. The 2017 cycle requires a label on the product that proves the listing.

### 590.6

Basically require all receptacles that are not part of the permanent wiring to be GFCI protected. Permanent wiring used by personnel shall be GFCI protected but can be a listed cord set or a device.

Listed GFCI cord sets must be provided on permanent outlets to new construction during the final stages of the job until completion.

All 125V single phase receptacles of 15A, 20A and 30A must be GFCI protected.

### 590.6(B)(3)

In addition, a contractor must also implement an assured equipment grounding conductor program. This requirement is similar to OSHA 29 CFR 1926.404(b)(1)(iii).

In part, this would require a contractor to establish a program that tests, certifies and records that the E.G.C. of cord sets, cord and plug connected equipment and receptacles not part of the permanent wiring of the structure or building is connected to the E.G.C. These tests must be performed at a minimum of three month intervals.

A good practice would be to require these tests every month and to use colored phasing tape to match to the current calendar month. This would have to be a written program used companywide with the records made available at a jobsite for review. The employer must also designate one or more competent people to implement the program.

With these requirements and those found to reduce Arc Flash dangers, you can see that the NEC is committed to jobsite safety as well as the safety of electrical installations after construction.

*Mark Cook is Technical Training Consultant for Faith Technologies in Neenah, Wis. He has been in the electrical industry since 1978 and owned a contracting business from 1994-2015. He was an instructor for the IEC of Arizona and The Electric League of Arizona and has presented for NEC and other organizations. Questions/comments: AZAP277480@gmail.com*

## THE ELECTRIC TIMES

SERVING THE ELECTRICAL INDUSTRY IN ARIZONA

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## Got a nice set of wheels?

Do you have a work or play vehicle that you take pride in? The Electric Times wants to highlight at least one of its reader's rides each month. Whether it is the loyal work truck that helps you make a living, or your dream car that is the result of all your hard work, we want to see it. Email a high-resolution photograph of your Nice Ride (or a few of them) to: editor@elaz.org.



## IEC National convention coming to Phoenix in October

Katie Mayer  
Electric Times

A new demonstration theater, a redesigned layout and new and improved events and activities are all planned for IECCon17, the Independent Electrical Contractors (IEC National) annual conference, which will be held in Phoenix Oct. 25-28.

IEC Arizona and IEC Southern Arizona will be the host chapters for the event, said Executive Director Nancy Levey. It last came to the Valley in 2010.

"We're thrilled they are coming back," Levey said. "It's great to have it here, because my contractors don't have to travel, and it's a win-win for the local chapters."

A spokeswoman for IEC National said Phoenix was selected because it is "a hotbed for innovation, growth and construction."

According to event organizers, the conference helps companies stay competitive

and increase profits. The event is now in its 60th year and is led by thought leaders in the electrical community. Leading-edge education sessions include topics such as the latest building information modeling (BIM) software, an ideas swap class—where participants can share what works and what doesn't in their companies—and finding and retaining great employees, among other topics.

IECCon17 will also feature an interactive expo with more than 100 companies and manufacturers. Throughout the expo, the National Apprentice of the Year competition also takes place and features the top graduating electrical apprentices from IEC campuses throughout the country.

"No stone has been left unturned," said the IEC National spokeswoman. "Our approach has been focused on the impact to the attendee."



Award recipients gather on stage during the 2016 IEC National convention. The 2017 meeting will be held in Phoenix Oct. 25-28.

She added, "[We're] working to maximize on the IECCon17 experience, so that all who attend have huge ROI and take-

aways to elevate their business success the very next day."

See 'IEC' page 8

## ASU solar

Continued from page 1

Electrical, Computer and Energy Engineering

Bertoni, who received two grant awards, is working on a process called "spalling," exfoliating a wafer from a silicon block, which has potential as a waste-reducing production method for wafers.

"During our previous DOE award we have shown that the technique works; now we need to fine tune the parameters to evaluate the potential for upscaling," said Bertoni. "This could be a disruptive technology with applications well beyond silicon."

Bertoni is also serving as co-PI on Assistant Professor Owen Hildreth's award which focuses on ways to lower solar cell

cost significantly through reducing silver consumption.

"The solar cell industry currently spends more than \$14 billion per year screen printing silver electrodes on the top of solar cells; this project aims to reduce those costs by a factor of 10 and reduce solar cell wafer production costs by 27 percent—making solar energy even more affordable to consumers," said Hildreth.

Stuart Bowden, associate research professor in the School of Electrical, Computer and Energy Engineering, is designing a novel photovoltaic cell architecture known as M-CELL. This structure is a single silicon wafer, which allows integration and interconnection of multiple cells in series to enable higher voltage and lower current than exist-

ing modules.

Tamizhamani is investigating new methods for rapid and accurate characterization of photovoltaic modules in operation. As is, these methods are slow, expensive, do not have the ability to account for differences between lab and field conditions.

Tamizhamani explained, "Obtaining string and module I-V curves simultaneously is of great importance to plant owners and service providers to identify the underperforming modules and to determine the degradation rates and module mismatch losses."

Tao's work focuses on a two-layer aluminum electrode for replacement of the silver electrodes currently used in silicon photovoltaic cells. If perfected, the aluminum electrode could reduce processing expenses

and improve device lifetime and reliability while maintaining high efficiency.

"For the second year in a row, our faculty won more SunShot awards than any other institution in the country, reaffirming our leadership in the research, development and advancement of photovoltaic science and technology," said Kyle Squires, dean of the Ira A. Fulton Schools of Engineering at Arizona State University. "Photovoltaics are a key component of tomorrow's energy solutions and this recognition from the Department of Energy highlights not only our faculty's research excellence and the inherent value of their ideas, but also the breadth and depth of research in the Fulton Schools of Engineering."

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## Allied Group Sales to represent Dialight lighting line

Alan M. Petrillo  
Electric Times

Allied Group Sales Inc. (AGS), headquartered in Phoenix at 201 S. 28th St., has been appointed as the manufacturer's representative for Dialight in Arizona, Las Vegas, and southern Nevada.

Michael Knoblock, principal vice president of lighting and energy solutions for AGS, said that while Dialight has a number of different divisions, the products that AGS will be repping for them will be lighting for hazardous locations, like NEMA 4X and explosion proof lighting for power plants, mines and wastewater treatment plants; and also obstruction lighting, like that used at airports, on cell phone towers, and on smokestacks and high buildings.

Knoblock noted that the appointment to rep Dialight went into effect July 3. He called Dialight "one of our anchor lines, along with LSI Industries." Other large manufacturers AGS reps are Satco Products, Universal Lighting, Nora Lighting, FSC Lighting, and Simkar lighting.

In addition, Allied Group Sales serves as manufacturer's representative for Bergen Industries, ESL Vision Lighting, Howard Lighting Products, Komee USA, Wattstopper (Leland Group) Lighting Group of America, Lite the Nite, LVS, Nuvo Lighting. AGS has represented manufacturers in

Arizona, New Mexico, Las Vegas, and El Paso since 1997, Knoblock pointed out.

"Our goal at AGS is to represent the top manufacturers in our industry," Knoblock said, "and we believe this (Dialight) is another great offering to our valued customers. We consistently strive to expand our presence while maintaining the highest level of commitment to serving the manufacturers we represent, as well as our customers."

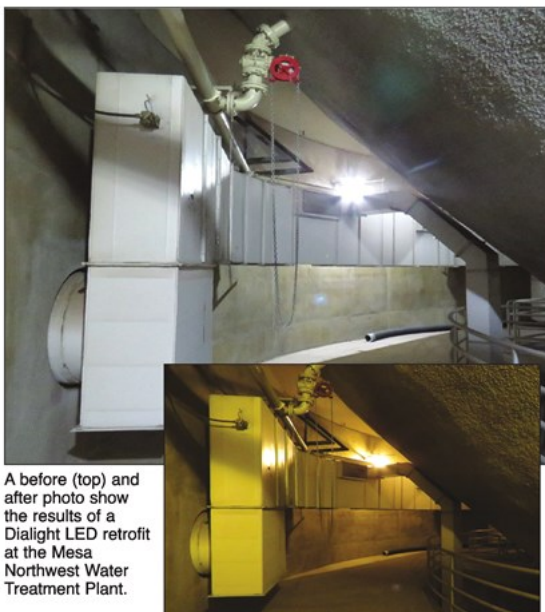
Knoblock noted that Allied Group Sales is experiencing a large upturn in business.

"Our business is exploding," he said. "Our business plan is to reach out farther and farther, and to strategically develop a footprint in the electrical industrial market, picking up lines and new employees in that area."

Knoblock pointed out that AGS already has a strong presence in lighting retrofits.

"It's our specialty," he said. "We also do very well representing in the specification market, where we call on architects and engineers."

Regarding the new relationship with Dialight, Knoblock explained that "Dialight just installed their 1 millionth LED fixture, so they now have more LED installs than any other industrial lighting manufacturer in the country."



A before (top) and after photo show the results of a Dialight LED retrofit at the Mesa Northwest Water Treatment Plant.

## Arizona Builders Alliance to hold annual convention in October in Tubac

Alan M. Petrillo  
Electric Times

The Arizona Builders Alliance (ABA) will hold its annual convention Wednesday, Oct. 4 through Oct. 6 at the Tubac Golf Resort & Spa in Tubac, Ariz.

Erica Lange, ABA vice president, said she expects at least 200 attendees at the event, which would equal or be greater than last year's attendance of 120 professionals and 80 spouses at the Poco Diablo Resort in Sedona. Attendees in the past have included company owners and presidents, principals, project directors, pre-construction managers and estimators, and business development and marketing professionals.

**Attendees in the past have included company owners and presidents, principals, project directors, pre-construction managers and estimators, and business development and marketing professionals.**

Lange noted that the convention offers attendees "an agenda rich with educational opportunities, as well as several fantastic opportunities for networking."

The convention will kick off with a golf tournament on Oct. 4, followed by a Howdy Partners welcome party with an Old West theme, Lange said, where most guests don old-time duds to get in the western spirit. An Aces High Texas Hold 'Em tournament will be run during the welcome party, as will a Bingo Bonanza event.

Oct. 5 will feature a welcome and chapter updates from Mark Minter, ABA president, and Lange, followed by a presentation by Kenneth T. Sullivan, PhD, MBA, an associate professor at Arizona State Univer-



ABA members on the General Contractors panel respond to audience questions during the 2016 ABA annual conference.

sity, talking on "Optimizing Your Key People."

Following that, a "Legal Update: New AIA Contracts and Other Recent Developments," will be presented by Mike Holden of Holden Willits at 10:15 a.m., after which, "Suicide Prevention" will be presented from 11 a.m. to 2 p.m. by Michelle Walker of Specialized Services Co., and David James of FNF Construction. Lange pointed out that the construction industry has the second highest suicide rate as an industry in the country.

That day, a "Calamity Jane" spouse lunch and wine tasting will be held, along with a High Noon-ish lunch on the patio. After lunch, Bill Beausy, a motivational speaker, will deliver a keynote on "Breaking Your Belief Limits," followed by an Owner's Panel at 3 p.m. Later on Thursday, the ABA board will meet, followed by a "Best in the West" reception and dinner party.

On Friday, Oct. 6, Anriban Basu of Sage

Policy Group in Washington, D.C., will deliver the keynote on "Markets, He Wrote: Looking for Clues Into the Economy's Direction." After the Friday keynote, the ABA will feature the ABA General Contractor Member panel of 16 participants, moderated by Martin Hedlund, division manager and senior vice president of Sundt Construction.

ABA is an alliance of the Arizona Chapters of the Associated Builders & Contractors and the Associated General Contractors of America - Building Chapter. It represents more than 300 member companies, including contractors and professional service firms, serving the needs of the commercial & industrial construction industry. Its mission is to lead its members and the construction industry to greater productivity and profitability through education, networking and business development opportunities, and legislative advocacy on behalf of the commercial construction industry.

## NEMA indexes decline but remain positive

Roslyn, Va. — The NEMA current conditions index slid by more than 20 points from the near-term high of 76.5 reached in March of this year. As recently as last month, the current conditions index topped 60 but fell 7.2 points to reach July's value of 53.3. Most of the change came from a larger share of respondents—67 percent in July versus 58 percent last month—who reported unchanged conditions. The share of those who noted that conditions are worse increased by only two points to 13 percent this month. Some respondents mentioned sluggishness in key markets, while others noted improving economic conditions overall.

The reported intensity of change in electroindustry business conditions continued to erode in July. The median value of this measure remained at 0 for the second consecutive month. The mean value, which is a more volatile measure, declined from 0.3 in June to 0.1 this month. Panelists are asked to report intensity of change on a scale ranging from -5 (deteriorated significantly) through 0 (unchanged) to +5 (improved significantly).

The future conditions index fell even more dramatically than the current index. In January 2017, the six-month ahead index stood at 91.7 but dropped 35 percentage points since that zenith. July's reading clocked in at 56.7 points, down from 68.4 last month. Unlike the current index composition changes, most of the decline in the future index could be attributed to the 27 percent share of July's panelists who expected worse conditions in six months, which was an 11 point increase from June. The share of those expecting unchanged conditions edged up only slightly from 32 percent in June to 33 percent in July.



## ACT changes name as part of rebranding effort

Alan M. Petrillo  
Electric Times

Arizona Construction Trades (ACT) is the new name of the former Alliance of Construction Trades after the organization's board of directors recently acted to rebrand the group and expand its reach in the state.

ACT is a non-profit trade association representing over 177 specialty trade contractors and material suppliers in the construction industry.

Michele Bettini, president and chief executive officer of ACT, said the use of the word "Alliance" in the group's name "is very old school and didn't reflect the broadening focus of the organization."

Along with the name change, ACT also

changed its logo, Bettini said, "to make it more 21st century, to get rid of the old-boys-club image, involve more women, and move forward for everyone in the construction trades."

Bettini noted that ACT has a number of women-owned businesses among its members.

"We also work closely with the National Association of Women in Construction (NAWIC)," she said, "as well as Southern Arizona Home Builders Association (SAHBA), and the Arizona Transportation Builders Alliance (ATBA)."

Besides changing its name and expanding the group's focus to more areas of the state, Bettini said ACT will be sponsoring

more construction-related events during the year, will begin publishing an electronic newsletter, and do more emailing and web-site work with members and the public.



Bettini said that ACT's mission is to provide a forum to improve business conditions for its members through united and cooperative action for the betterment of the construction industry and the community.

"ACT is the only construction associa-

tion that concentrates exclusively on the business issues affecting all subcontractors and material suppliers," she pointed out. "We deal with issues such as slow payment, back charges, retainage, delay claims, cash flow problems, litigation, insurance costs, financing and contract language."

Bettini noted that ACT's growing membership includes firms both open shop and union, representing every trade specialty, general contractors and home builders for commercial, residential, and public construction. The group's membership also includes service providers to the subcontracting community, such as insurance brokers, attorneys, business consulting firms, truck dealers, and rental equipment firms, among others.

## Technology, robotics having impact in construction industry

Alan M. Petrillo  
Electric Times

Joey Shorter, PhD, director research for the National Electrical Contractors Association (NECA) in Washington, D.C., explores the world of technology, and how it applies to the world today, including the construction industry, through the NECA's Project for Applied and Disruptive Technology. Shorter is the architect of a series of electronic communications that highlight how technology and robotics are affecting various fields of work.

Shorter believes that construction companies are experiencing a long-overdue digital transformation where IT applications are helping fill the gap and give companies the ability to consolidate and to report and see everything in real time. Shorter said that architects, engineers, contractors, supervi-

*Shorter thinks that one of the biggest challenges for construction sites will be handling change management during the coming period of generational transformation when Baby Boomer and Gen X workers will be replaced by tech-savvy Gen Y and Z workers.*

sors, foremen, and even electricians and HVAC techs, are all becoming more informed.

With growing access to real time information, a lot of paperwork of the present and past is becoming obsolete, Shorter observed. How many reams of paper were just filed away, or trashed altogether, and never used, he asked.

But beyond saving paper, new technologies being brought into the industry also are improving productivity, Shorter maintained. As project delays are reduced, added benefits

such as enhancing the quality of buildings are being realized, and with working conditions and environmental compatibilities improving, the industry will continue to see tremendous strides in worker safety, he said.

Shorter thinks that one of the biggest challenges for construction sites will be handling change management during the coming period of generational transformation when Baby Boomer and Gen X workers will be replaced by tech-savvy Gen Y and Z workers. Shorter noted that as the faces of the construction industry change, technological

advances will continue to make the construction sector more interesting and cost effective.

Shorter said that 44 percent of future construction and real estate roles are predicted to be automated, with the impact of augmented reality (AR) and virtual reality (VR) on construction already being felt. Users can see a finished building before construction even begins, he observed, while investors are visualizing properties before investing, and architects are creating designs in the virtual world before building in the real world.

He estimated that the use of AR and VR is expected to increase 140 percent in the next five years. In addition, the expanded use of drones and 3D printers will continue to increase, especially in the world of construction, Shorter said. He said he believes the

See 'Technology' page 8



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### MTU End-User Feature Series:

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## Project Focus: Queen Creek Fire Station No. 1

Jayne Cook  
Electric Times

The Town of Queen Creek officially opened the new Fire Station No. 441 (known as No.1) on Wednesday, March 29 of this year. Located on Ellsworth Loop, the state-of-the-art fire station replaces the existing Town Center fire station and boasts new features that improve response times and elevate firefighter safety.

Fire Station No. 1 is part of an \$18.9 million project which also includes the Queen Creek Fire and Medical Department Fire Station No. 412, and 413 a public safety building which will be home to the Maricopa County Sheriff's Office Queen Creek substation, as well as community chambers. The building design allows the option for expanding to include a court facility later if desired.

Queen Creek Mayor Gail Barney commented, "As a community, we continue to experience steady growth and it is important that our programs and services expand appropriately; the fire station is designed to meet the continued growth of the Town."

Core Construction, the Phoenix-based general contractor that spearheaded the project worked very closely with Phoenix building designer Perlman Architects of Arizona, Inc. and with the Town of Queen Creek to make this project happen.

Ken Powers, Architect, LEED AP, Principal at Perlman Architects of Arizona described the station's aesthetic style as "a modern interpretation on 'Regional Ranch' architecture which is compatible with the existing Town Municipal Services Building and set a strong regional precedent for the adjacent Law Enforcement/Community Chambers Building and the future master planned Municipal Center development."

"Although, the Project was not LEED certified, the Town of Queen Creek and Design-Build Team emphasized the implementation of numerous sustainable design concepts stressing energy and water use efficiency, overall health and well-being of the fire fighters, operational efficiency and durable, low maintenance systems and materials," Powers explained.

Contributing to many of these efficiency characteristics of the facility were subcontractors AME Consulting Engineers, working on mechanical and plumbing, and Akribis Engineering LLC, completing the



The new Queen Creek Fire Station No. 1 includes features that help improve response times.

electrical engineering work.

The scope of AME Consulting Engineers contributions included the following: installation of high efficiency 15 SEER Split System Heat Pumps tied into a Town energy management control system; installation of high efficiency radiant heating at apparatus bays (the bays where the fire trucks are stored); set up of apparatus bay systems that incorporate displacement airflow in a push/pull method mixing fresh air makeup from evaporative coolers to displace contaminated air which is then exhausted to the outside through high volume powered exhausters. These displacement airflow systems are interlocked to the apparatus bay doors so that the exhaust systems only operate enough to clear the air, but will remain in off position when not needed for energy savings. For efficient plumbing, low water use plumbing fixtures were installed.

Working just as diligently, Akribis Engineering tackled the electrical aspects of the project which included installation of an interior and exterior LED lighting package, interior occupancy sensors for energy conservation, variable lighting levels for many

interior areas, exterior photocell and time-clock for outside lighting, and maximization of natural daylighting to minimize required lighting during daytime hours.

The finished facility is 13,000 square feet and includes three bays, an onsite workout facility, and living quarters for the battalion chief and the firefighters. The living area can house both the on-duty fire crew and a second crew if the station requires expansion.

Fire Chief Ron Knight explained that the new station is just across the street from the former building, but that change in location makes a big difference.

"It will provide more direct access to a major artery road, which is a benefit to our residents," Knight said. "Our new station ... meets or exceeds current standards, and will help enhance the services we provide to Queen Creek, and the region. As a fire department, we are committed to serving this community, but we are also committed to the health and safety of our firefighters."

In addition to bumping up the efficiency of the facility's function, and in addition to

improving response time, Fire Station No.1 has also incorporated features supporting a healthier and safer environment. The ground concrete flooring throughout public areas of the station tapers any biohazard exposure the crew might face. The exhaust ventilation system reduces the firefighters' diesel exposure, and the facility's expanded laundry areas reduce possibility of contamination.

Formed in 2008, the Queen Creek Fire and Medical Department originally had only two stations, and both were created to be temporary facilities. In 2013, an updated Municipal Master Plan allowed for modest funds to be dedicated toward the building of permanent fire stations, then again in 2015, the updated Fire and Emergency Services Master Plan allowed for the remaining funds required to be dispersed. The Town of Queen Creek is providing a safe community and the opportunity for a fulfilling lifestyle to its residents. With Fire Station No. 1 completed and several projects underway, Queen Creek is making significant strides toward town goals.

## DVS

Continued from page 1

was working a massive agricultural project for Daisy Brand Foods. According to an Interstates newsletter, staffing in the then-rural town of Casa Grande became a significant issue, and after becoming acquainted with Desert View Electric, "it became clear that merging operations with Desert View would create something more than each of the firms could have accomplished separately in the area."

Determining that Desert View Electric's company mission and values were closely aligned with Interstates' own, the construction company proposed to acquire the local electric contractor.

"It was a really tough decision," said Scott. "Had it been any company other than Interstates, I don't think we would have sold. We knew them to be a company with integrity and we still have a good working relationship with them to this day."

Ultimately, Scott accepted Interstates' offer in order to spend more quality time with his family, and to devote more time to

volunteer in church activities. Interstates took on the entirety of Scott's staff, save for the low voltage team that remained independent with Scott.

Fast-forward to five years after the acquisition and Scott reacquired the electrical division in 2013 under the name Desert View Systems, Inc. (DVS).

**One aspect of DVS' success is the agricultural niche they have carved out for themselves. A particularly memorable project Scott recalled was a massive grain storage facility.**

Scott, who said he sort of just fell into the electric industry because his father worked in it, confessed, "Believe it or not, I actually missed it."

Though working low voltage jobs like fire alarm and security systems kept Scott and his team busy, he said he missed the

ever-changing challenges of the industrial, commercial and agricultural electric work.

Michael Pool, who began work in the industry with Scott in the 1980s, took the position of vice-president of operations in 2013 when Desert View Systems was again able to open their electrical division.

"Fortunately, we were also able to get back the majority of our former employees as well as keep some of the Interstates team," Scott explained. "With those key components in place, the company has continued to gain momentum and is again striving to build a team that is passionate about their work and committed to making a difference."

One aspect of DVS' success is the agricultural niche they have carved out for themselves. A particularly memorable project Scott recalled was a massive grain storage facility.

"When we were finished [with the electric work] on that project, the facility was capable of unloading and storing a 100-car train in less than 12 hours," Scott recalled.

Scott said that generally he and his team

go where the work is, though a rough idea of their service area is about an 80-mile radius from their home base in Casa Grande. Due to the amount of work the company has been doing in Arizona, a satellite office for the Phoenix area is currently underway. They also plan to open a satellite office in the northeast region, given he finds the right employees.

"A company is only as good as its employees, so we take the time to find the right people," Scott said. "Our company philosophy has always been that we treat our employees and customers as good as family. If you are honest, fair, affordable, and offer a quality product, your customers will return."

About 90 percent of DVS' clientele is return customers. Scott said until recently, they'd never had the desire to advertise.

"We don't even have the name of our company on our trucks," he admitted, "but as we branch out further into the state, we need to get our name and our reputation out there."



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## Technology

Continued from page 5

world of construction is undergoing a metamorphosis that can lead to efficiencies, improved structures and products, as well as more rewarding work for owners, designers and workers. Disruptive technologies, Shorter added, are impacting construction now.

Talking about robotics, Shorter maintained that if robots can care for the aging as is happening today, they surely can be programmed, trained or taught to assist on a construction site. Beyond the warehouse and simple cataloging or restocking of supplies, robots could be given the task of monitoring or tracking tool use, and supplies dissemination on the job site, he said. Likewise they could be summoned to retrieve or deliver special tools or supplies. The same robots, he added, could be used around the clock as roving security.

Shorter pointed out that researchers at Stanford University have designed a robot that could be used on construction sites to guide wire into tricky work spaces. The robot, which carries a payload of up to 150 pounds, expands from an 11-inch casing up to 236 feet in length, and is able to slide

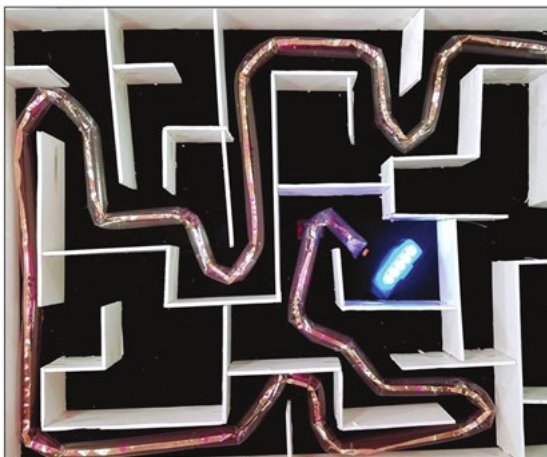
under doors, through cracks, and turn corners to get to its destination.

The robot's casing is made of polyethylene (the same material as a plastic grocery bag) and expands through inflation, driven by a battery powered air mattress pump. A camera sticks out of the end of the robot's body and its cable runs through the core of the entire length of the robot. As the body grows, it pulls the camera with it, and unspools part of the cable.

Payloads, such as a wire cable, that would be delivered at the end of the robot's designated length, are attached to the tip of the robot's body, and emerge once the robot completely unfurls.

Stanford researchers believe future versions of the robot could use more robust materials, like ripstop nylon or Kevlar.

Shorter noted that as robots are developed further, it isn't difficult to conceive that the machines also could be deployed in the area of safety on the job. Jobsite deployment of robots is going to become more and more prevalent, Shorter predicted, especially as the skilled workforce is elevated to higher tech skills on the job.



Stanford University researchers have designed a robot made of an 11-inch polyethylene casing that expands through air inflation up to 236 feet, which can deliver a payload of up to 150 pounds of wire cable.

## IEC

Continued from page 3

The event will also include special networking events. One such event is the welcome reception, which features emerging leaders in the industry and will be hosted at The Park, a pour-your-own brewpub where guests can also play corn hole and eat food truck fare. On Friday night, "A Night at the Hop" bash will commemorate IEC celebrating 60 years of service through the support of IEC National Platinum Partners. And the week will close out with the President's Awards Gala, which will showcase the best in the electrical and systems trade industry

across the country.

There will also be a golf tournament, which Levey and her team of volunteers are organizing to be a similar experience to IEC Arizona's annual golf tournament, which is very popular every year.

"Everything I do for the golf tournament, I'm implementing that into national," Levey said.

And although such an event takes a lot of time, Levey said her volunteers make the job so much easier.

"We have the same great group of volunteers year after year, and they do such a

great job," she added.

In addition to all the networking and social events and education, another event is expected to be popular among attendees, said CEO IEC National Spenser Villwock.

"One notable peek into the event that is creating a tremendous amount of buzz is called, 'The Grid.' It is engineered as a demonstration theater at IECCon17, where exhibiting companies provide hands-on experience to IEC contractors and Expo attendees," Villwock said.

IEC National President, Bruce Seilhammer likened The Grid to "a crystal ball into

the future."

"It will feature new and innovative products and business solutions that educate and entertain attendees with an energetic and interactive experience on The Grid stage," Seilhammer said. "The attendees will then have the chance to vote on whether they would purchase your product."

Also at the event, participants will be able to take the test on-site for the Certified Professional Electrician (CPE) designation.

Event organizers said the event draws about 1,500 attendees every year. For more information, visit <http://www.ieci.org/iec-cpe>.



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## ELECTRIC LEAGUE OF ARIZONA ELECTRICAL CONTINUING EDUCATION



### ONE DAY NON-COLLEGE CREDIT SEMINARS Electric League Training Center, 2702 N 3<sup>rd</sup> Street, Phoenix, AZ 85004

#### ELA 70 - ELECTRICAL SAFETY FOR COMMERCIAL/INDUSTRIAL FACILITIES

Date: Friday, October 27, 2017  
Fee: \$255 Members/\$285 Non-Members  
Instructor: Daniel Turley  
Time: 8:30 a.m. - 4:00 p.m.

Note: Course fees include copy of the NFPA 70E 2015, handouts, Continental breakfast, and lunch.

This full-day class will cover an overview of the NFPA 70E with a focus on chapter 1 including: Arc Flash & Arc Blast Hazards, Flash Protection & approach boundaries, Hazard Risk Categories & selection of appropriate PPE. Lockout Tag out procedures, general Electrical Safety related to electricity in Commercial and Industrial facilities. Recommended Safety practices and OSHA Codes.

Who Should Attend: Highly recommended for Facility Maintenance Technicians and Building Operators, Electricians, HVAC technicians and their Supervisors.

#### ELA 13 - NEC 2017 CODE UPDATE

Date: Friday, December 1, 2017  
Fee: \$255 Members/\$285 Non-Members  
Instructor: Daniel Turley  
Time: 8:30 a.m. - 4:00 p.m.

Note: Course fees include copy of the NEC 2017 Soft Cover, handouts, Continental breakfast, and lunch. (\$50 off for those with Code Books)

This course will cover modifications in the NEC and discuss why the rule changes were made. Topics also include safety aspects of the NEC changes, conflicting rule changes, how to apply the changes to real world projects and how the rule changes affect overhead costs.

#### ELA 13 - NEC 2017 CODE UPDATE

#### ELA 70 - ELECTRICAL SAFETY FOR COMMERCIAL/ INDUSTRIAL FACILITIES

#### ELC 119 - CONCEPTS OF ELECTRICITY AND ELECTRONICS

#### ELC 120 - SOLID STATE FUNDAMENTALS

#### ELC 123 - RESIDENTIAL ELECTRICAL WIRING AND CODES

#### ELC 124 - INDUSTRIAL WIRING & CODES

#### ELC 125 - COMMERCIAL ELECTRICAL WIRING AND CODES

#### ELC 162 - ELECTRICAL CODES & INSPECTION I

#### ELC 163 - ELECTRICAL CODES & INSPECTION II

#### ELC 164 - GROUNDING & BONDING

#### ELC 210 - AC/DC MACHINERY

#### ELC 217 - ELECTRIC MOTOR CONTROLS

#### ELC 218 - VARIABLE FREQUENCY DRIVES

#### ELC 144 - BASIC AUTOMATED SYSTEMS (PLCs)

#### ELC 103 - ELECTRICAL/MECHANICAL CALCULATIONS

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**Chris (Butch) Owens:** Mr. Owens is currently a Partner and Service Manager for Mech-Line Services LLC and has worked in several capacities for the refrigeration industry for over 24 years. Mech-Line Services is ABB HVAC Drives Manufacturer's Representative in Arizona. Butch holds over 28 Variable Frequency Drives, Motors, Hardware and related Certifications with ABB pertaining to AC Drives and Induction Motors. He is also EPA 40 CFR and Section 609 EPA Certified for refrigerants high and low pressure and is most honored to be part of a development council for ABB HVAC Drives for future products.

**Dan Turley:** Mr. Turley has over 27 years of experience in the commercial and residential electrical industry and currently works as a maintenance electrician. He has over 12 years of supervisory experience, including over 8 years as a Licensed Arizona electrical contractor, and has overseen large electrical installations. He is a certified Level 1 Thermographer. One of his current projects is to perform Arc Flash Studies on various buildings in the valley and to apply NFPA 70E to promote electrical safety in the work place. His expertise is in Commercial, residential and Industrial electrical work but he has general knowledge and understanding of plumbing, HVAC, and maintenance procedures. He has long been interested in vocational education, completing a Master of Education degree in Educational Media and Computers. He has written several computer-based training programs. He also has a Bachelor of Science in Psychology from ASU.

**Elmer Tepper:** Mr. Tepper entered the electrical industry as an electrician and worked in this field for almost fifteen years. After receiving his BSEE degree, he worked in electrical engineering design and project management for a variety of industrial, commercial, and institutional facilities. After receiving his MS degree, he provided specialized consulting for many high tech projects. His most recent work had been developing and conducting training seminars and quality assurance programs.

**Steve Holmquist:** Working for several Fortune 500 companies over the last 37 years, Steve is experienced in every phase of facilities management, construction, maintenance, production systems and system integration projects from planning to completion. Expert level knowledge and proficiency in critical building infrastructure design, construction, manufacturing and operations. Designed and managed construction of data centers, industrial and commercial buildings and the systems that reside within these facilities.

**FOR MORE INFORMATION AND REGISTRATION, PLEASE CONTACT  
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## Building Operators' Certificate Program

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The ELA Institute for Facility Management Education presents an educational program leading to a certificate in Building Operations. The certificate will be of most benefit to managers with total responsibility for multi-facilities, as well as those with single facility responsibility.

The program is offered eight hours a day, one-day a week for 8 weeks at the ELA Institute located in the Electric League of Arizona Education Center.

#### FME 101

##### HVAC Fundamentals in a Commercial/Industrial Facility

**Course Description:** A discussion of commercial systems, chiller systems, and A/C control systems in a modern industrial setting.

**Course Content:** A discussion of types of systems and controls working with application sequences, energy efficiency, diagrams and specific HVAC Controls.

#### FME 102

##### Airflow Dynamics for the Commercial/Industrial Facility

**Course Description:** A thorough understanding of airflow dynamics can enable you to uncover and resolve system problems.

**Course Content:** An overview of what causes most airflow related problems and how they can be prevented.

#### FME 103

##### HVAC Codes and Safety for the Commercial/Industrial Facility

**Course Description:** A discussion of local and national health, safety, energy and environmental codes as they relate to the HVAC system in a Commercial/Industrial Facility.

**Course Content:** An overview of codes, standards and specifications and how they apply in a Commercial/Industrial Facility.

#### FME 104

##### Electrical Codes and Standards for the Commercial/Industrial Facility

**Course Description:** Electrical, energy management and related codes that facility managers must know.

**Course Content:** Compliance with the most important maintenance related codes and their application to an energy efficient building.

#### FME 105

##### Electrical Maintenance and Power Systems for the Commercial/Industrial Facility

**Course Description:** Maintaining and operating electrical systems in a facility.

**Course Content:** An overview of electrical power systems, electrical maintenance and their application to the facility.

#### FME 106

##### Electrical Safety for the Commercial/Industrial Facility

**Course Description:** A discussion of commercial facility safety practices as it relates to electrical systems.

**Course Content:** An overview of safety practices related to electricity and how it relates to the Commercial/Industrial Facility.

#### FME 107

##### Lighting Fundamentals and Efficiency for the Commercial/Industrial Facility

**Course Description:** A broad-based discussion of lighting fundamentals and efficiency

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## Facility Maintenance Technician Program

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The Electric League of Arizona education department and the Arizona Heat Pump Council present an integrated, HVAC and Electrical maintenance program to meet the unique training need of facility maintenance departments. Graduates of this program receive the "Facility Maintenance Master Technician" designation.

#### About the Program:

This program has been designed by industry educators and practitioners, associated with the Electric League of Arizona's education department and the Arizona Heat Pump Council. This session will be taught by one of the League's electrical instructor and a lead instructor for the Arizona Heat Pump Council education program. Upon completion of this 16 week 2 nights a week program, successful students will receive a Certificate of Completion and Facility Maintenance Master Technician Patches. (A "C" average or better is required for successful completion.)

## Course Coverage

### HVAC Curriculum:

The HVAC training will include a comprehensive review of refrigeration system fundamentals, refrigerants, HVAC equipment, air movement and measurement, air quality, residential & commercial systems, air & water source heat pumps.

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- Refrigeration Theory II
- Refrigeration Components
- Introduction to Refrigerants
- Charging & Piping
- A/C Control Systems I
- A/C Control Systems II
- Review and Quiz
- Refrigerators and Freezers
- Residential Systems - Air Conditioning
- Residential Systems - Heat Pumps
- Commercial Systems
- Air Quality and Distribution (Air Flow)
- HVAC Systems Troubleshooting
- Servicing Commercial Systems
- Review & Final Exam

### Electrical Curriculum:

The electrical training will include a comprehensive review of basic electrical fundamentals; practical installation, operation, maintenance, and troubleshooting techniques, with an emphasis on electrical safety procedures.

- Concepts of Electricity I
- Concepts of Electricity II
- Basic Circuitry I
- Basic Circuitry II
- Basic Circuitry III
- Commercial & Industrial Buildings Practical AC Circuits
- Commercial & Industrial Practical AC Power Delivery
- Building Systems Control Systems
- Electrical Codes and Standards
- Basic AC/DC Rotating Electrical Machinery
- Variable Frequency Drive Systems I
- Variable Frequency Drive Systems II
- Electrical Power Quality Commercial & Industrial
- Electrical Troubleshooting I
- Electrical Troubleshooting II
- The Importance of Electrical Safety

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## DC current making major comeback, according to panel of National Lighting Bureau experts

Shepherdstown, W.Va. — Walk around just about any office in the United States and you'll see dozens of power modules — point-of-use power transformers — plugged into conventional alternating-current (AC) electrical outlets, transforming the incoming AC to low-voltage direct current (DC), for use by telephones, tablets, laptops, and other electronic devices, including light-emitting-diode (LED), electric-illumination installations. Now, lighting-system manufacturers are heading forward to the past,

bringing DC circuitry—called "power over Ethernet" or PoE—to the office and other workplaces, so point-of-use power transformation will no longer be required. Two experts discussed PoE at the National Lighting Bureau's Annual Lighting Forum during a session called "Illuminating the Future, Part One." The two experts were Lisa L. Isaacson (NuLEDs) and Michael S. O'Boyle (Philips Lighting).

EdisonReport Editor and Publisher Randy Reid moderated the panel. The video

is now available free from the National Lighting Bureau.

According to Isaacson and O'Boyle, PoE differs from conventional DC networks in that the cabling used can carry both power and communications signals, much as a smart phone that receives both power and communications signals when it is connected to a computer via a universal serial bus (USB) connector.

The panelists noted that PoE will not eliminate the need for conventional AC cir-

cuitry, but it will eliminate the need for AC power transformation when it comes to power for electronic devices. Both panelists also expressed confidence that PoE will likely be installed routinely in the near-term future, not only because of the versatility it provides, but also because it is safer to handle: Line-voltage AC can cause fatal accidents; low-voltage DC is much safer. PoE systems will also become less costly to install, Ms. Isaacson said, because less installation labor is involved.

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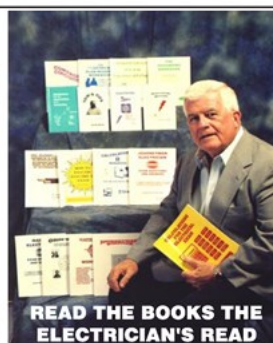
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| Ordering Number | Trade Size | Cable O.D. Min | Cable O.D. Max | Wire Bundle O.D. Min | Wire Bundle O.D. Max | Conductor size # of Conductors* (AWG/KCMIL)           |
|-----------------|------------|----------------|----------------|----------------------|----------------------|---|
| B412            | 1"         | .780           | 1.120          | .650                 | 1.000                | 6/3, 6/4, 4/3, 4/4, 2/3, 2/4, 1/3                     |
| B413            | 1-1/4"     | 1.000          | 1.460          | .870                 | 1.370                | 2/3, 2/4, 1/3, 1/4, 1/0 3, 1/0 4, 2/0 3, 2/0 4, 3/0 3 |
| B414            | 1-1/2"     | 1.360          | 1.770          | 1.250                | 1.590                | 2/0 4, 3/0 3, 3/0 4, 4/0 3, 4/0 4, 250 3, 250 4       |
| B415            | 2"         | 1.700          | 2.200          | 1.550                | 2.050                | 250 4, 300 4, 350 3, 350 4, 500 3                     |
| B416            | 2-1/2"     | 2.100          | 2.700          | 1.950                | 2.400                | 500 3, 500 4, 600 3, 600 4, 750 3                     |
| B417            | 3"         | 2.500          | 3.300          | 2.250                | 3.000                | 600 4, 750 3, 750 4                                   |

\*Examples of 3- and 4-conductor cables accommodated.



IN MULTIPLE SIZES

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Patented

LISTED

Made in USA

## BOX EXTENDERS

EXTEND SET BACK ELECTRICAL BOXES UP TO 1-1/2 INCHES



Same Cost as BE2

BE2X

BE1X Single gang

BE2X

Two gang w/ large perforated flange

Larger flanges cover miscut openings

Our non-conductive UL/CSA Listed Box Extenders extend set back metal or non-metallic electrical boxes up to 1-1/2". They level and support a wiring device. There's no need to tape the sides of a receptacle to prevent arcing in a metal box.

NEW! TWO-GANG style with larger flange covers miscut openings. Perfect for both mid and max plates – flange is trimmable for use with standard cover plates.

Both 'larger flange' versions cost the same as our 'regular' BE1 and two-gang BE2 so if you normally use a mid plate these are the box extenders for you!

- Complies w/ NEC (314.20) for set back boxes
- 2-hour fire rating
- Offered in a variety of styles, including round



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Patented/Other patents pending

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## IN BOX RECESSED BOX

LOW PROFILE • WEATHERPROOF IN USE

JUST FOR 1-1/2" AND FOAM WALL SYSTEMS!



Save on labor and materials with IN BOX™, the one-piece, recessed electrical box for exterior use. It eliminates installing an electrical box and bubble cover assembly.

Plus, it installs in the wall so less shows outside. It's that simple. Fewer parts to handle. Time savings. A great-looking job. Get it all in Arlington's IN BOX!

- Non-metallic, 22.0 cu. in. electrical box with extra duty weatherproof while-in-use clear or white cover
- For single-gang devices – no gaskets required

MEETS 2014 NEC Section 406.9... which REQUIRES an extra duty weatherproof while-in-use cover for all outdoor 15 or 20 AMP receptacles.



DBVME1W w white cover



For 1-1/2" wall systems, including foam, DBVME1 has a fixed, built-in flange that eliminates a separate flashing.



DBVMA1C w clear cover



Adjustable to fit ANY foamboard wall (2-3/4" to 5") or custom stucco finishes from 1/4" to 2-1/2" thick.



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